American Gas Association MONTHLY

Gas Industry Manpower Survey

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Saving Tin in Meter Soldering

•

Determination of Peak Demand

•

Wartime Home Service Extras

•

Using Gasoline for Gas-Making

December 1942

VOLUME XXIV NUMBER 11

Ack-Ack guns should be included in Cook Books!

THEY'D remind you that Gas, the same fuel you cook with, is indispensable to making guns, tanks, planes, ships!

They'd remind you to use this vital fuel *wisely* in your home.

For without the *speed* of Gas, months would be lost heat-treating mountains of metal.

Without the *economy* of Gas some weapons would cost 3 times as much . . . millions of dollars added to the taxpayer's burden.

Without the *precision heat* of Gas, airplane propellers, armor plate, bomb fuses and shells could not be made as fine or as fast as they are today!

Ordinarily there is ample Gas for all needs. This winter, however, with a vastly increased War production requiring tremendous additional quantities of Gas, you may be asked to curtail your household use of Gas. But remember doing your part will help make available Gas for vital War industries . . . Gas essential to Victory!

AMERICAN GAS ASSOCIATION

EVERY DAY 85,000,000 AMERICANS DEPEND ON GAS . . . to save time, money and food in cooking . . . to preserve food safely in silent Gas refrigerators . . . to heat water and homes economically. In thousands of towns and cities, the Gas Company is community headquarters for cooking and nutrition information. If you want the latest advice on these important subjects, consult your Gas Company.

Buy War Bonds today—save for the Certified Performance Gas range of tomorrow.

GAS

is vital to war production . . . use it wisely!

American Gas Association MONTHLY

CONTENTS FOR DECEMBER 1942

The gas industry is beginning to feel the manpower pinch. In this issue, Kurwin Boyes presents the results of a survey by the Personnel Practices Committee which includes valuable suggestions for utility management. We like best the incident about the gas company president who appealed directly to his customers via personal memo asking for help in locating wartime workers. It looks as if women rate the Number 1 spot in the dwindling "manpower" pool—and no glamour required to get the job. . . . It's a small problem indeed that has only one approach. While others have tried to solve the tin shortage for meter soldering by reducing the tin content, John Godsoe steps to the front with a simple new approach that knocks normal practice into a cocked hat and rings the bell in saving both tin and lead. . . . For serious students of the gas industry, the article by Messrs. Henderson and Buffington on coincident peak hour demand is a real find. . . . Who said gas companies were slow to carry the conservation ball? Take a peek at the double-page spread of ads on page 436-437. . . . Also cookin' with gas in this issue, many other timely features.

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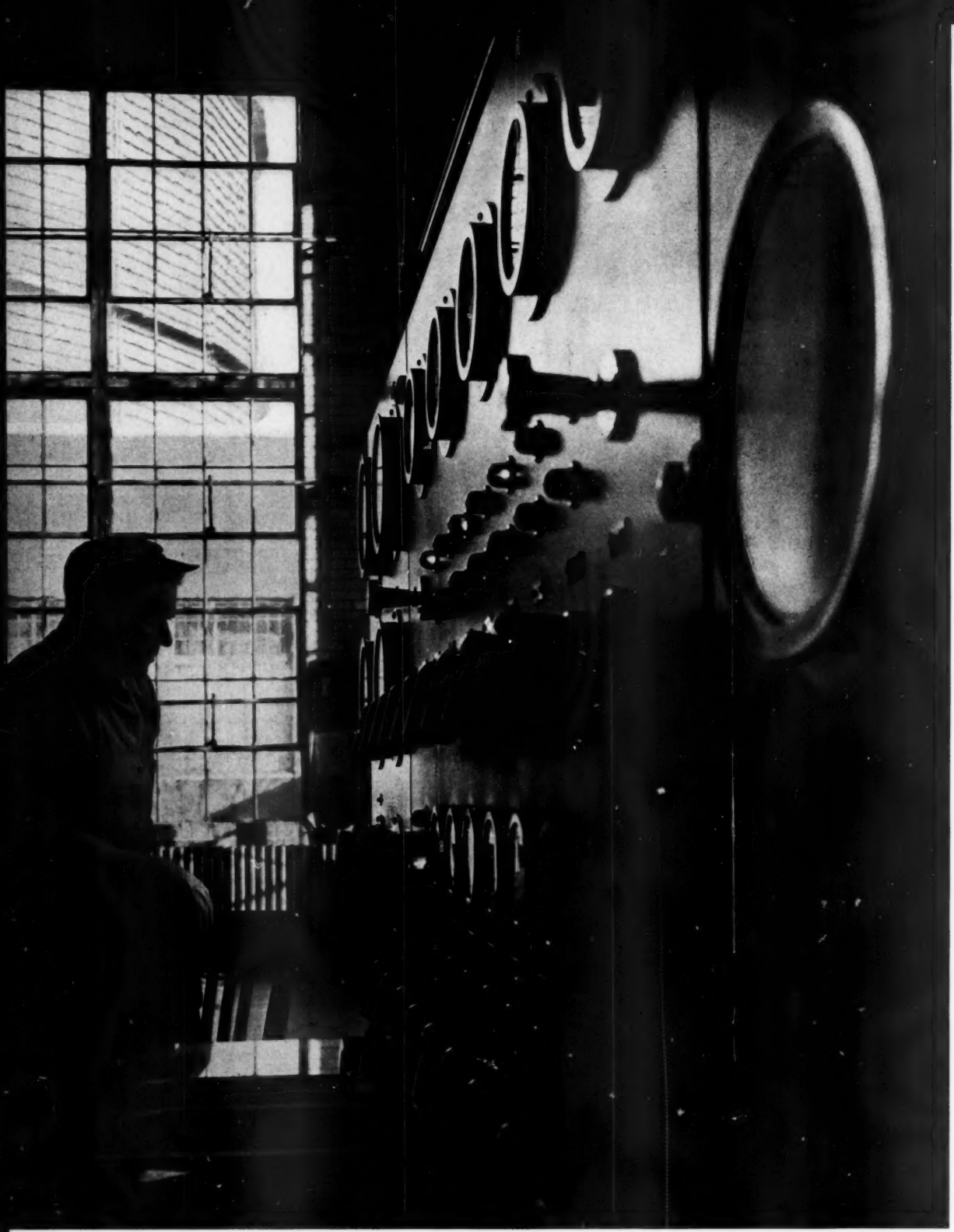

Control board for storing and dispatching gas at the Calumet Station of The Peoples Gas Light & Coke Co., Chicago. The revolver-like handles motivate electric controls which turn the valves on the lines leading to the holder. Photograph by Torkel Korling.

American Gas Association MONTHLY

JAMES M. BEALL, *Editor*

MANPOWER
... A Cross-Section of Gas Industry Experience

By KURWIN R. BOYES

Secretary, American Gas Association

IN view of the increasing urgency of a situation which is causing national concern, the Committee on Personnel Practice of the American Gas Association decided to take a look at the gas industry manpower situation and to make available a report of what is being done about it. A number of representative companies were questioned and the results of the sampling are embodied in this article.

As might be expected, conditions vary widely as indicated by the fact that one company reports ample personnel while another wired it is desperately in need of manpower. The majority of gas companies, however, are faced with manpower needs, at least to a degree, and have already adopted relief measures. All anticipate a progressively graver shortage, particularly if present conditions are permitted to continue. Plans are being made accordingly.

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The survey indicates that the gas industry is prepared to do its utmost to help win the war. As one executive expressed it: "We do not expect to ride through the war period without suffering hardships due to manpower shortage. Some of our normal activities will be modified or suspended entirely but we expect to be able, through careful planning, to carry on the essentials."

Employees of gas companies enjoy an advantage of continuous employment, particularly when compared with war duration industries, which should be realized. However, serious loss of employees to other industries was reported by several gas companies and a number expressed concern about this loss. In some industrial centers anti-pirating agreements prevail to which essential industries, including utilities, subscribe. While apparently these agreements have had an insufficient trial as yet, the hope is that they will be sufficiently effective to confine the manpower problem in those centers to military losses. Until some control is established, one company expects to handle each individual case as it arises. There is, of course, the possibility of Federal control to prevent the "pirating" of employees of essential industries, perhaps to be included in some national service law. A gas company president called attention to the possibility of some classification of skills in industry for the purpose of providing the Government with a pool of skilled manpower, which it will finally draw upon to produce the maximum war effort on the part of each individual.

Several companies are anticipating a gradual extension of the work week to 44 or 48 hours, which would provide at least partial relief. One company, when this expedient alone will not suffice, plans to (1) employ replacements not subject to draft, and (2) make interdepartmental transfers. Another expressed a reluctance to extend the work week because of the complications of group disability insurance and other benefits based on the present 40-hour week. A number are studying how to get the best results from a change to a 48-hour week.

It was reported by several that wartime measures, affecting customers have met with fine public cooperation, particularly when explained by publicity such as newspaper ads, bill enclosures, etc. "It pays to say 'why' when you have to say 'no,' " as the Pullman Company so aptly puts it.

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It was generally agreed that the first step in an approach to the manpower problem is to take a thorough inventory of either or both jobs and personnel. A questionnaire used for this purpose is included on the next page. An inventory was used by one company as a basis for forecasts for each department to determine probable losses to military services between now and the end of 1942. This company assumed, with rare exceptions, that all male employees under thirty years would be lost to military service.

Another company is making a similar survey by jobs, with a description of each job, and an estimate of the time

required to train a replacement. Employees are being classified as (1) Women, (2) Over-Age Men, (3) Married Men with Dependents, and (4) Men Subject to Draft. The last group is to be divided between those for whom deferment will be asked and those for whom no deferment will be requested. It is anticipated that the study will be used eventually to determine how many jobs could be filled by women and over-age men and plans would be adopted accordingly. In another instance, the survey was used to determine the minimum number of employees required as well as those for whom deferment would be requested.

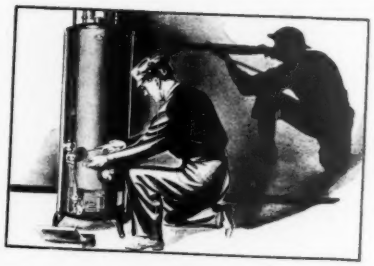
Still another reports the classification of employees on a skill basis to secure an indication of the type of workers it will be difficult to replace. Another states its survey attempts to ferret out employees having useful skills other than those used in their regular daily employment. This company is planning to transfer any employees who have mechanical skills that are not being fully utilized in their present jobs. In one case all employees in 1-A draft classification who are in a selected group for whom deferment will be requested are being so advised. Another reports that its survey has already been used to replace men with women where practical.

A few anticipate a requirement making it necessary to obtain new employees through the United States Employment Service. One company states it is finding this service and all private employment agencies least productive of results. A canvass of filling station operators by one personnel management met with some success due to the closing of many stations. A company located in a critical area on the Pacific Coast has sent bill enclosures to all customers asking for volunteers and has secured a number of likely employees from this source. The enclosure, headed "Memo from the Desk of the President," addresses the customer "Dear Friend," and is signed by the President. It reads:

"We of the X Gas Company feel that in many of our customers' homes there are capable persons, not at present employed, who have a patriotic urge to do something to help the war effort. Perhaps they're not just sure how this can best be done.

"You'll be interested to know the X Gas Company is classified by Selective Service authorities as an essential industry in support of the war effort.

"Due to the war emergency we frequently need people to replace employees who are going into the armed forces (already thirty-eight of our employees are in uniform). If you are a competent, intelligent person willing to do your bit in our necessary public service, sign your name and address in the space below and mail or bring this slip to our office. If you have a friend who might be interested we would appreciate it if you would pass this message on to him or her."

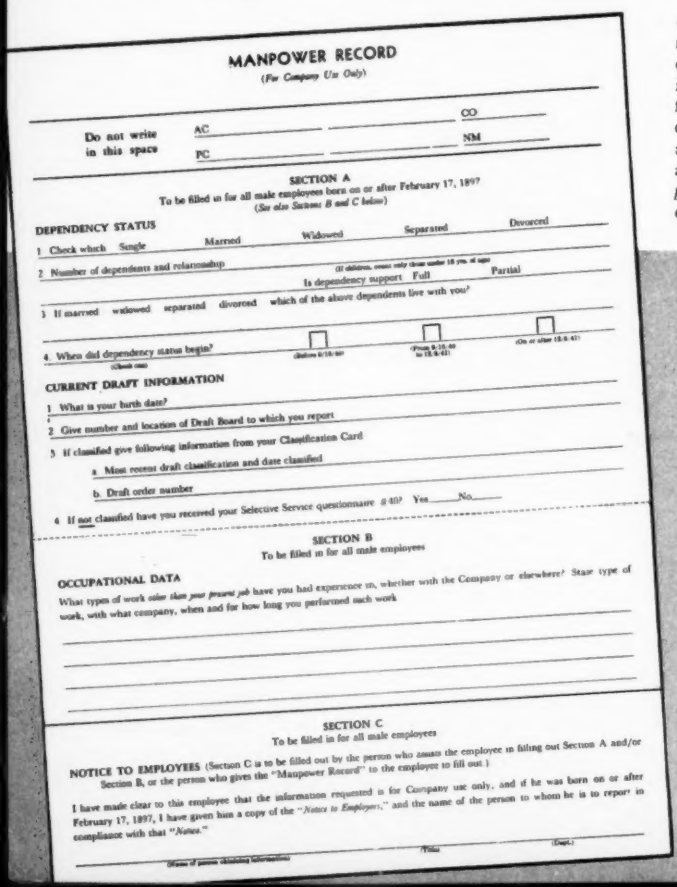


This illustration was captioned "While he checks your gas appliance his buddy 'checks off' a lap." It appeared in advertising of The Ohio Fuel Gas Co. explaining why gas service was less prompt than formerly

A company located in a critical area reports acute shortages of clerical help and laborers. Government competition made it necessary to increase starting rates on clerical jobs which helped the situation even though the quality of applicants has noticeably declined. Permission has been sought, without success thus far, to increase the rate on laborers to bring it in line with the local prevailing rate.

The following measures to meet the manpower shortage were reported as contemplated or adopted:

(1) Revamping of customer servicing to save mileage as well as manpower by: (a) Routing ordinary service calls by areas and handling them on the following day—emergency, no



MANPOWER RECORD

(For Company Use Only)

Do not write in this space — AC, CO, PC, NM

SECTION A

To be filled in for all male employees born on or after February 17, 1897

(See also Sections B and C below)

DEPENDENCY STATUS

1 Check which — Single, Married, Widowed, Separated, Divorced

2 Number of dependents and relationship

3 If married, widowed, separated, divorced, which of the above dependents live with you?

4 When did dependency status begin?

CURRENT DRAFT INFORMATION

1 What is your birth date?

2 Give number and location of Draft Board to which you report

3 If classified give following information from your Classification Card

a Most recent draft classification and date classified

b Draft order number

4 If not classified have you received your Selective Service questionnaire #40? Yes No

SECTION B

To be filled in for all male employees

OCCUPATIONAL DATA

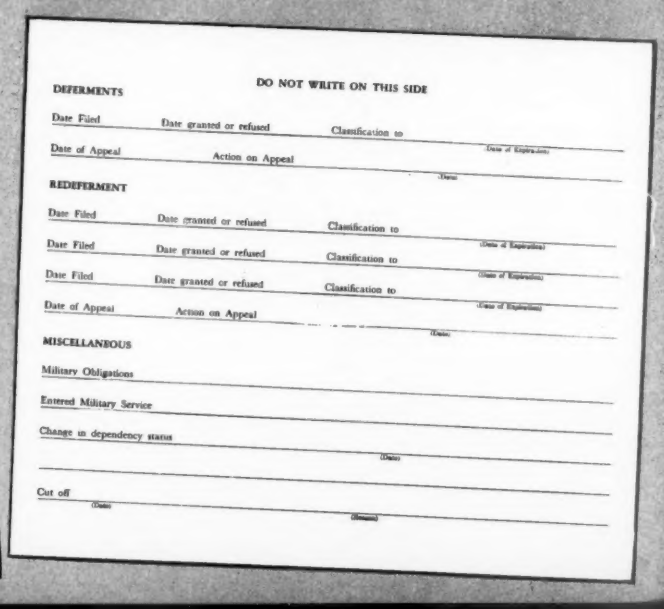
What types of work other than your present job have you had experience in, whether with the Company or elsewhere? State type of work, with what company, when and for how long you performed such work

SECTION C

To be filled in for all male employees

NOTICE TO EMPLOYEES (Section C is to be filled out by the person who assists the employee in filling out Section A and/or Section B, or the person who gives the "Manpower Record" to the employee to fill out.)

I have made clear to this employee that the information requested is for Company use only, and if he was born on or after February 17, 1897, I have given him a copy of the "*Notice to Employees*," and the name of the person to whom he is to report in compliance with that "*Notice*."



DO NOT WRITE ON THIS SIDE

DEFERMENTS

Date Filed — Date granted or refused — Classification to — (Date of Expiration)

Date of Appeal — Action on Appeal — (Date)

REDEFERMENT

Date Filed — Date granted or refused — Classification to — (Date of Expiration)

Date Filed — Date granted or refused — Classification to — (Date of Expiration)

Date Filed — Date granted or refused — Classification to — (Date of Expiration)

Date of Appeal — Action on Appeal — (Date)

MISCELLANEOUS

Military Obligations

Entered Military Service

Change in dependency status — (Date)

Cut off — (Date) — (Reason)

Reprinted from *New York Herald Tribune*

Girl meter readers in snappy new uniforms such as these employed by the Public Service Co. of Northern Illinois, are rapidly replacing men in the Armed Forces

gas and leak calls are handled the same day. (b) Meter sets or removes are completed on the day following receipt of order.

One company has instituted a charge for certain servicing work formerly done free of charge which has resulted in a reduction of the amount of servicing work with a corresponding saving in the number of service men needed. A new work completion schedule has been put into effect in the customers' service division of one company and resulted in more efficient use of manpower. Plumbers are being used to install appliances wherever possible by some companies.

(2) The extension of the length of time gas meters may remain in service in a number of states.

(3) Meter reading every two or three months. One company, granted approval of quarterly reading by the Commission, delayed putting it into effect until spring in order to have a monthly check on residential gas usage during the winter as many customers might use kitchen ranges for heating purposes. Estimated billing is used in cases where no admittance is possible to obtain meter reading. Another reported that a change of meter reading from one to three months resulted in some extra manpower which is being fitted into mechanical operations where the needs are greatest. Younger boys are being successfully used in one instance for meter reading with a possible turnover as they reach draft age. Some companies are having customers read their own meters, particularly those customers located in scattered areas.

(4) The discontinuance of gas main extensions enables maintenance operations with less manpower.

(5) Use of women for delivering bills, reading meters, clerical work, customer contact positions, elevator operators, drafting, addressographing and messengers.

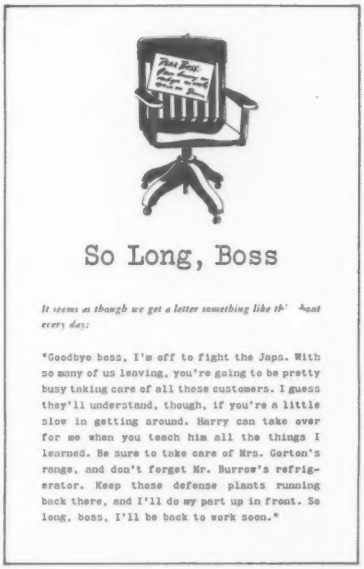
An executive predicted "we will be replacing males with females to a degree we have thus far not even dreamed of. In England females are doing everything but the most arduous and hazardous jobs." At least a partial confirmation of this prediction is the report of another company that it is using women as firemen. There seems to be no question but that women will invade new pursuits in a way only a shortage of men will make possible. However, competition in the employment of women is already keen in parts of the country.

(6) Mailing instead of delivering bills. Postcards are used for this purpose in at least one city. One company is using former bill deliverers to fill meter-reading vacancies when meter readers are called into military service.

(7) Government restrictions on sales released certain employees including salesmen, stockroom workers, drivers, helpers, installers, etc., who were used elsewhere.

(8) Reduction of collection effort. One company has instituted a plan of Selective Collection Treatment which has effected a considerable saving in manpower devoted to collections without any appreciable rise in the percentage of delinquent outstanding accounts.

(9) Transfer of employees to secure the maximum utilization of mechanical skills.



Advertisement of the Jersey Central Power & Light Company

British Manpower Experience

(Extract from October 29 letter of B. Mittell, general manager, Electric & Musical Industries, Ltd., Hayes, Middlesex, England, to Davis M. DeBard)

MANPOWER (and that means womanpower too) is the key or bottleneck to everything. The Government has a Manpower Board which can over-rule all the Ministries and arrange the allocation of manpower from time to time in a properly balanced way. No individual has any permanent settled position whatever. The Government has complete powers to dispose of everybody's possessions in any way they think fit; they have the same powers in regard to everybody's services. Any allocation or reservation is purely temporary in the immediate circumstances of the moment. The Defence Regulations of 1939 say: "The Minister of Labour and National Service may direct any person in the United Kingdom to perform such services as may be specified which that person is, in the opinion of the Minister, capable of performing."

Although our factory is of course working almost exclusively upon munitions of war of high priority (like every other factory of its type), men up to 30 who have not already gone into the fighting Services are now being combed out, and the Manpower Board sends its representatives down to supervise this combing. The only exceptions are the higher grade of skilled craftsmen such as tool-makers and auto-setters and perhaps, in some cases, capstan-setters. Male capstan operators and machine operators are not exceptions; they must be replaced by older men (who have already been absorbed) or by women.

The problem in our case is accentuated by the fact that there have recently been some special registrations (ship-building, general building and mining) to cope with particular situations of urgency.

The method of coping with this situation has been to appoint one of our own staff as Dilution Officer and his job is to take charge of the upgrading of labour. Women who have had some factory experience are trained for a more skilled class of work. The present system is that a competent girl, say from the assembly line, goes to a Government Training School in the neighborhood for 12 weeks to learn the work of handling a milling machine. She then comes back to us and works for 24 weeks under supervision. At the end of 32 weeks she is a sufficiently skilled operator to carry out a certain group of operations.

I have gone over this question of up-grading labour before, but I want to emphasize it because it is the most effective solution for our most serious problem—that of manpower. I want to make it clear, too, that I am obviously not referring merely to upgrading of men and women in the factories on to plain repetition jobs. Such jobs are being done by the new influx of workers. A woman has to be married and responsible for looking after a family in order to escape being called up for those jobs—and even then she is expected to come in part time.

My particular emphasis is on the unusual degree of skilled and intelligent usefulness which the brighter women can achieve in a few months.

The office staff is being combed out in the same way as the Works. Able-bodied men and young women can only be retained if the Manpower Board agrees that they are in key positions.

Special Girl Training Corps are being organized for instruction to Cadets of 16 to 18 years in useful war activity—Home Nursing; Food Production; Use of Tools; Aircraft Construction; etc.

(10) The acceptance of employees unable to meet former standards because of physical deficiencies or deformities. Several are considering, as a preventive measure, the hiring and training, regardless of present needs, the minor physically handicapped male applicants who can be fitted into the organization at a later period. Another company is hiring from minority groups and from the 4-F classification.

(11) Jobs simplification by cutting out all non-essential work.

(12) The hiring of high school and college students on a part-time basis for routine work.

(13) Rearrangement of groups to facilitate the speedy training of new employees. As an illustration, young women are now being employed as posting clerks in the commercial offices of one company. The cash posting operation is a simple one and can be learned quickly. If the posting clerk has been on the job for some time, there is ample opportunity for her to become familiar with more complicated phases of customers' accounts bookkeeping. These employees will be upgraded through the more difficult positions as occasion develops.

(14) Consideration to the possibility of eliminating certain periodic reports and to further saving of time in preparation of forms. Under the stress of wartime considerations certain reports and details might be eliminated which would otherwise be considered essential. One company has made considerable saving along these lines.

(15) Intensification of study of procedures for the purpose of perfecting improvements, particularly along the channels of saving manpower. An executive commented: "War brings about the creation of substitutes and the development of new ideas that result, in many instances, in material improvement in our economic life. Undoubtedly, war conditions will bring about changes in our own operations which will ultimately result in operating improvements without the loss of efficiency."

(16) The shifting of night telephone operators and despatchers who previously had servicing experience to servicing and replacing them with women transferred from other departments.

(17) Job training programs and upgrading. One company is preparing to introduce a prescribed course of supervisory training.

One company is contemplating hiring some men on parole who have been thoroughly examined in every respect and who will be closely supervised by the parole officers in their respective working locations. The chief Parole Officer of the State advises there are about 600 available, 44% negroes. It is their experience that 14% are later arrested and returned to institutions. A company of that State now employs 62 and another 27. Both companies are not utilities.

The government on November 6 adopted the "Manning Table Plan,"

(Continued on page 468)

Meter Soldering . . . *Experiments Point to New Method of Conserving Tin*

By JOHN E. GODSOE

Superintendent of Distribution
Brooklyn Borough Gas Company
Coney Island, N. Y.

THE Pearl Harbor episode threw a monkey wrench into many of our complacent ways of doing things. For years we ran along smoothly—and too smugly it is feared—performing certain operations in the belief that our way was *the* way.

Among the many disruptions which that fateful December 7 brought to the gas industry was the necessity for reducing the tin content of solder used to maintain gas meters.

In compliance with the War Production Board's order, the industry went to 40% tin solder. We found that this solder was satisfactory for meter repair work.

30% Tin Solder Considered

Subsequently, it was suggested that, in the interest of still further conserving critical tin, a solder of 30% tin content be considered. It was pointed out that experimental work had been done with this solder and that the results indicated it was practical for meter repair use. However, there was no general acceptance of the solder alloy suggested. Meter shops were reluctant to state that the solder was satisfactory. This reluctance seemed to be based on doubt.

Because of this situation, a meeting of a number of gas company representatives was held at the American Gas Association's offices in New York. Here it was decided that companies carry on further experimental work with the object of attempting to settle what had become a controversial subject.

The author spent more than half of a comparatively long gas company career as a meter repairer. Therefore, he decided again to don overall and apron, heat up a pair of soldering coppers and attempt to find out what it was all about.

An experienced solderer develops an additional sense. This sense enables him to know when his copper is at right temperature—when his solder is running as it should—when he is sweating a secure seam. He feels security or its lack beneath his tool. This feeling flows from the material into his consciousness. No man can impart this sense to another. It comes only with experience.

Gas meters are mighty important devices. Not only because they must supply the industry with a record of accounts receivable, but because they convey through their vitals a gas which, if not held in strict confinement, can prove to be a dangerous agent.

The author's conclusion, based on his own work actually performed at a repair bench is, that the use of solder with a tin content as low as 30% does not result in a reasonably secure meter repair job. True, this conclusion is based primarily on the aforementioned soldering sense rather than on accelerated tests simulating field conditions. However, the conclusion is still maintained.

In the interest of our common objective, we all want to conserve tin to the utmost, but, in the case of gas meters, we do not want to reach a point at which safety is sacrificed. In fact, we don't want to approach too near that point.

When calculating the conservation of tin through the use of low tin solders, we make our comparisons, of course, with the use of 50% tin solder during the pre-war period. We assume, without question, that the quantity of 50% tin solder we used per unit of repair was the proper amount. Why?

The writer recalls the early days of his meter repair experience. At that time lapped seams were sweated, but never beaded. The finished product was tight and stayed tight in the field. Besides, a meter so soldered possessed a pleasing appearance. Beading became the vogue of a later period. Even today, some manufacturers of new me-

John E. Godsoe

Herewith the MONTHLY presents what is believed to be a new approach to the subject of solder usage—a subject which has leaped into prominence as a result of the tin shortage. Mr. Godsoe's article is based entirely on studies made at the Brooklyn Borough Gas Company's plant and is contributed solely to aid in solving a vital wartime problem.

Mr. Godsoe's background, which includes many years' experience in meter repair work, dating from his employment in 1903 as apprentice meter repairer for Consolidated Gas Company of New York, lends weight to his views. In addition to being employed by Brooklyn Union Gas Co., Montreal Light and Power Co., Wilmington Gas Co., and Brooklyn Borough Gas Co., he has been employed in meter manufacture by John J. Griffith Co., Philadelphia, American Meter Co., New York, and Superior Meter Co., Brooklyn. Prior to his present position, he was successively, meter superintendent and superintendent of customers' service of Brooklyn Borough Gas Company.

Table 1
LEAKS UNDER TWO POUNDS SUBMERSION TEST

	50–50	40–60	30–68–2
Normal usage	None	1	3
Economy usage	1	1	8

Explanation

50–50 Economy usage. 1 Leak. Pin hole. Back-plate seam.
40–60 Normal usage. 1 Leak. At juncture—side and bottom. Front case seams.
40–60 Economy usage. 1 Leak. At juncture—side and gallery. Front case seams.
30–68–2 Normal usage. 3 Leaks. Cracks on case seams.
30–68–2 Economy usage. 8 Leaks. 7 Cracks. Case side seams. 1 Crack case bottom.

ters run only sweated lapped seams.

"Tin Solders," by S. J. Nightingale, published by British Non-Ferrous Metals Research Association, 1942 edition, says of sweated joints: "There is nothing to be gained by the use of an amount of solder greater than is necessary adequately to fill the joint." It may be mentioned in passing that the material contained in "Tin Solders" is the result of twenty years of research work.

For the purpose of experimenting with the possibility of more economically using solder in repair work, Brooklyn Borough Gas Company chose the five light, new diaphragm repair as a standard. A number of five light tin skeletons were weighed with their respective parts such as discs, cases, backplates, valves, indexes, index shafts and the diaphragms to be installed. These meters were divided into six equal groups. Three of these groups were repaired in the conventional manner with sweated and beaded seams, using 50-50, 40-60 and 30-68-2 solders respectively.

The second three groups were repaired with the same solders, but conservative use was attempted consistent with reliably secure results.

Finished meters were reweighed. The difference between the unassembled and assembled weights, represented then, the quantity of solder required for assembling each meter of each group.

The total weight of solder used for each group was taken for comparison, rather than the per meter weight as the sum of weights considered the various techniques employed throughout a group of repairmen. In addition, the totaled weights represented a range of meter condition and age.

All meters were subjected to submersion test for leaks under two pounds air pressure. Failures are given in Table 1. Additional solder required for repairing leaks is considered in the comparative weights shown in Tables 2, 3 and 4.

Table 2
NORMAL USAGE BY WEIGHT

	50–50 oz.	40–60 oz.	30–68–2 oz.
Tin	66.25	58.40	53.40
Lead	66.25	87.60	121.04
Antimony	——	——	3.56
Total	132.50	146.00	178.00

Table 3
ECONOMY USAGE BY WEIGHT

	50–50 oz.	40–60 oz.	30–68–2 oz.
Tin	41.25	40.60	47.25
Lead	41.25	60.90	107.10
Antimony	——	——	3.15
Total	82.50	101.50	157.50

Table 4
COMPARISON OF ECONOMICALLY USED SOLDERS WITH 50–50 SOLDER NORMALLY USED

	Normal Usage 50–50	Economy Usage 50–50	Percent Difference	Economy Usage 40–60	Percent Difference	Economy Usage 30–68–2	Percent Difference
	oz.	oz.		oz.		oz.	
Tin	66.25	41.25	Less 37.73	40.60	Less 38.71	47.25	Less 28.67
Lead	66.25	41.25	Less 37.73	60.90	Less 8.07	107.10	Plus 61.66
Antimony	00.00	00.00	Less 00.00	00.00	Less 0.00	3.15	——
Totals	132.50	82.50	Less 37.73	101.50	Less 23.39	157.50	Plus 18.86

All we claim for what we have done is, that it is representative of the Brooklyn Borough Gas Company's conditions. It is acknowledged that meter repair shop procedures and techniques vary. However, we believe that basically all meter repair work is the same. At any rate, the fundamental idea behind what we have tried to do is common to us all.

Conclusions

1. Prior to tin restrictive orders, more solder per unit of repair was used than was required.
2. Thoroughly tinned joint surfaces are imperative for the conservation of solder.
3. The beading operation can be dispensed with when using solders of 40% tin content or better.
4. Solders of 30% tin content must be beaded.
5. The bead required when using 30% tin solder is really a cover-over for a cooling crack.
6. At least as much tin can be conserved by economically using 40% tin solder as can be conserved by the best use of 30% tin solder.
7. The safety factor in the use of 40% tin solder is greater than can be obtained by the best use of 30% tin solder.
8. The economical use of 50-50 solder conserves more tin than the best use of 30% tin solder.
9. Soldering coppers do not deteriate as rapidly with higher tin content solders as they do with low.

Reference is again made to the book "Tin Solders." It is claimed by that authority that, as the tin content of solder is reduced below 40%, the material moves away from a true solder and assumes the characteristics of joint wiping solder. Quoting from that book:

"For general work, tin content should never fall below 40% for stick soldering. . . . Solders with tin content below this are not intended ever to be completely molten, but are for use in the plastic stage, as in wiping or plumbing."

E. H. Reed Dies

ERNEST HERBERT REED, president of the Republic Heater Corporation, manufacturers of automatic gas water heaters, died November 5.

A Year of M-68 . . . *Administration of WPB Conservation Order Cuts Steel Use 40%*

By D. R. KNOWLTON

Director of Production, Office of Petroleum Coordinator for War, Washington, D. C.

I SHOULD like to review the 11 months' history of Conservation Order M-68. You will recall that in the early fall of 1941 we, in the petroleum industry, were given to understand that those engaged in the production of petroleum would have to reduce our steel consumption during the year of 1942 at least 40 per cent below the 1941 consumption. It was proper that the Office of Petroleum Coordinator should be the agency charged with the responsibility of rationing the 60 per cent of the steel to be made available.

Rationing Methods

There were three ways in which it could be done. Some felt that the available steel should be directly allocated, joint by joint and valve by valve, to those wells and other uses which OPC and the War Production Board deemed entitled to the material. Others suggested that spacing rules for every field in the country should be written. The view of the Office of Petroleum Coordinator, and the view which finally prevailed, was to establish a countrywide rule governing the use of materials with a provision for exceptions where it was shown to be appropriate that an exception be granted. Conservation Order M-68 was the result.

Since the order was first promulgated, we have handled over 3,000 applications. Some have been for one well only, some have been for as many as 60 wells, and other applications have covered the installation of pumping equipment or the changing of production facilities on one or more wells. Of the applications filed shortly after the promulgation of the order, approximately 50 per cent were denied.

As the principles which governed the "office" in passing on the applications for exceptions were evolved and became known to the industry, the percentage of the applications which were approved increased. Presently, there are fewer applications being filed, and of those which are filed approximately 90 per cent are being approved. When the year is done, the year's use of steel will be within 1 per cent of the quota set—60 per cent of that used during 1941.

Half a Million "Block-Busters"

As a result of M-68 the industry, in 1942, will drill 13,000 less wells than normally would have been drilled. The steel which would have been consumed in equipping these wells is sufficient to build 26,000 fighting tanks. This quantity of steel will build half a million 2-ton "blockbuster" bombs which are so tormenting to the unholy triumvirate these days. If you ever get to wondering what your contribution to the war program has been, think of these figures —26,000 tanks—half a million "blockbusters!"

Material Use Cut

This coming year you will be called on for an even deeper cut in your use of materials. Our analysis indicates, however, that if we are to carry out those production operations which we deem to be essential in order to safeguard our oil supply, it is our opinion that the cut should not exceed 20 per cent under this year's consumption. This will bring us down to about 50 per cent of normal. The War Production Board will have the tremendous responsibility of distributing the available steel to the war plants and essential industries. In our dealings with the War Production Board, we are spreading every card on the table—face up. There has been no attempt to exaggerate our needs. Plain facts in plain words has been our theme.

Selective Drilling

Selective drilling is bound to come. And when it does, you will find drilling in some areas spread out to one well to 160 acres—maybe more—just enough drilling to define field limits and let us know how much oil we can plan on recovering. Materials are just that scarce.

Nationwide Survey

In anticipation of the time when it may become necessary to scrape the "bottom of the bin," we have recently asked the industry, through its district production committees, to undertake a nationwide survey of its production facilities to determine what quantities of materials may be reclaimed from those facilities and devoted to other uses, preferably without jeopardizing ultimate recovery of reserves.

Wells Classified

In a manner of speaking, we are asking the petroleum industry to do with its productive facilities what the selective-service system has done with the man power of the nation. The 1-A wells and production facilities—those from which materials can be made readily available—will include presently idle wells, high water-oil-ratio

This concise history of Conservation Order M-68 was presented at the annual meeting of the American Petroleum Institute in Chicago, November 12. While it refers specifically to the petroleum industry, the order is equally applicable to the natural gas industry and, consequently, its administration is of vital interest to the latter.

wells, high gas-oil-ratio wells, closely spaced wells, and other production facilities that may be dispensed with without injuring ultimate recovery.

Wells in the 1-B classification will include those border-line cases—wells that are presently being produced profitably, but which may be looked to as a source of materials and equipment if the materials shortage continues to be critical and the war is prolonged. Obviously, in such a classification, we reach a type of well that is the backbone of the nation's oil production. It is that type of well for which we will need repair and maintenance materials, in order that its productive capacity may be unimpaired. The weaker, unnecessary wells must be looked to as a source of materials with which to drill and maintain better wells, capable of contributing more to the war program.

Secondary Recovery

We hear so much about the need for exploratory drilling that I wonder if improved production methods such as pressure maintenance and gas and water repressuring are receiving the attention they merit. A temporary subcommittee on secondary recovery for Oklahoma has compiled a report showing that half a billion additional barrels of oil are available in that state through secondary recovery. It takes a lot of wildcat drilling to uncover a reserve of that quantity.

It is going to be absolutely essential that in every case where it is possible to substitute an advanced operating practice for the use of material that such a practice be instituted. The industry has always taken the lead in developing improvements, and I am confident that it will continue to do so.

Gas Industry Urged To Support "Share-the-Meat" Program

THE American Gas Association has received from Harrison M. Sayre, Acting Chief, National Organizations Section, Office of Civilian Defense, a special announcement of a new campaign being launched November 30 by Civilian Defense Councils through their block leaders and through neighborhood leaders in the rural areas, to tell Americans of the urgent need of voluntarily limiting consumption of meat. Mr. Sayre states that:

"Although our farmers this year have produced the greatest supply of meat in the history of the nation, there is still not enough to fill the demands of our armed forces, of our Allies, and of the civilian population. It will be agreed by all, the government believes, that the necessary reduction in consumption must come from American civilians. Our Army and Navy must have every ounce that they need, and the amounts going to our sorely pressed Allies are an absolute minimum for the maintenance of health and morale.

"The Office of Price Administration has already curtailed deliveries to retail butchers to approximately 80% of last year's supply. At the same time civilian demand for meat has increased with our higher national income this year. The Office of Price Administration will ration meats to the individual consumer also as soon as possible. The complexity of the problem, however, and the necessary time consumed in printing, etc., will delay this action for some months. In the interim, the situation must be controlled by voluntary action on the part of American consumers.

"The amount of meat available is 2½ pounds per week per person over twelve years of age, 1½ pounds per week for children six to twelve years old and ¾ of a pound for children under six. This is many times the ration in other nations at war and more than many American families have been able to afford in time of peace. It is an amount that will certainly cause no hardship, especially if full use is made of alternate food in the diet as suggested by the United States Government Nutrition Coordinating Committee.

"Will you inform your members of this campaign at the appropriate time? You can help by requesting your members to welcome these leaders when they call and to cooperate with them in every way. Mats with an appeal to welcome the block leader and citing her part in civilian war services are available upon request from local Defense Councils or by writing this office.

"Will you help to impress upon your members the need for *voluntary* sharing? We would like to hear from you as to how you believe your organization can help the success of this campaign. Its effectiveness obviously depends upon each individual accepting his own share of responsibility."

To aid individual members of the Association in cooperating with this program personally, Nine Golden Rules, approved by the Food Requirements Committee, War Production Board, are listed:

1. Plan meat meals ahead.

2. Know your meat cuts.
3. Store meat safely.
4. Cook meat properly.
5. Use every bit of your meat.
6. Be thrifty with meat left-overs.
7. Stretch the meat flavor.
8. Get all the meat information you can.
9. Try something new in meat.

Company members may secure further details from their Civilian Defense Council whose block leaders will be the principal means of distributing information to consumers. Companies may aid this program through notices in newspaper advertising, bill enclosures and through Home Service Department demonstrations and distribution and of recipes designed to conserve the consumption of meats in accordance with the rules listed above.

The planning of substitute menus has been an integral and important part of home service activities of many companies during the past. This government program affords gas company Home Service Departments an opportunity to show further leadership in aiding gas customers to make their contribution to this war effort.

Gas for Fishing Boats

THERE is seemingly no end to the uses to which gas can be put. The latest service this fuel is doing is in helping the Dutch people to supplement the small amount of food left them by the Nazis, by driving fishing boats which would otherwise be immobilized through lack of fuel. It is reported in a Netherlands newspaper that gas generators are to be fitted to the whole of the fishing fleet at the Dutch port of Ijmuiden. Three Dutch ports have already had the generators installed and it is expected that similar equipment will be fitted also in smaller boats fishing off Scheveningen.

A. G. A. Campaign . . .
Supports Conservation Program

GAS industry support of the War Production Board's fuel conservation program was announced November 18 when the American Gas Association released a gas conservation campaign specially designed for the use of local gas utilities. Central theme of the campaign which is directed to the household users of gas is "Gas Is a Vital Material—Use It Wisely."

The A. G. A. campaign was developed as the result of several conferences held by the Association's Committee on War Activities and Publicity and Advertising Committee with representatives of the War Production Board. The material is sufficiently flexible in form to enable gas companies to use it in whole or in part and to adapt it to their own local conditions. Suggestions for saving gas in the home as recommended by the War Production Board are incorporated in the Association's campaign. The W.P.B. has endorsed the campaign and recommended that it "be given enthusiastic approval and all possible help."

Specifically the gas industry campaign consists of mats of a series of 11 newspaper advertisements in two- and three-column size, a general booklet, "Keep 'Em Working and Conserve Gas," covering all phases of conservation and curtailment, and house-heating and kitchen-heating folders, suggesting ways to reduce heating costs. It is a two-part campaign, designed to conserve gas and other vital materials used in making gas, help relieve transportation congestion, and to curtail the use of gas if, when, and where necessary.

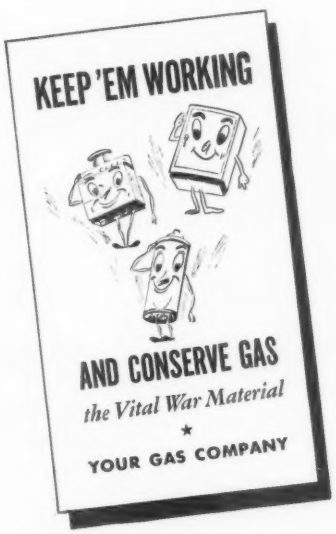
In making this campaign material available to the gas industry, the Association said:

"Enormous quantities of gas are being used and still greater amounts will have to be used in the production of implements and materials for the prosecution of the war as well as for essential civilian consumption.

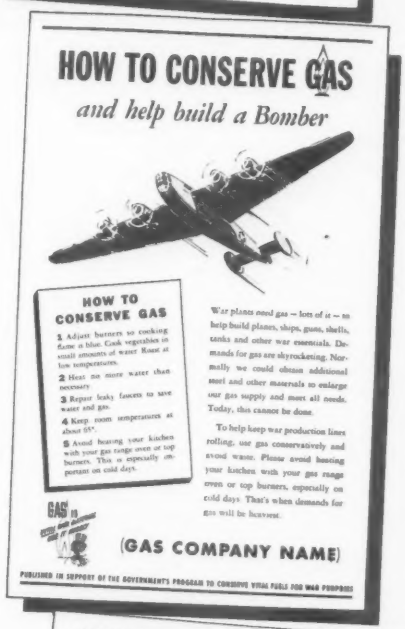
"In many instances the capacity of pipe lines, production plants and distribution facilities will be strained, particularly during the coming winter. It is highly necessary, therefore, that all wasteful use of gas in the home be stopped and that all possible economies in the use of this essential fuel be exercised.

"Since gas companies are unable, because of lack of critical materials to increase their production or transmission capacities, many of them face the possibility of shortages during the coming winter months. Conservation, which should be intensified on cold days, is necessary to help avert any such shortage.

"To the extent that oil and coal are used in connection with the operation of gas companies, conservation will save these critical fuels and transportation for essential war purposes."



Cover of booklet providing gas conservation and curtailment information. At right are three ads taken from the A. G. A. conservation and curtailment series



WE MUST ALL BUY MORE WAR BONDS

What You as a Gas User Ought to Know About

PEAK DAYS

It is part of your necessary war-effort education

FOR YOUR OWN GUIDANCE it is enough to know that a peak day in your gas service is a cold day in winter when our supply of gas is taxed to the limit. We want to introduce them to you. You will be hearing more about them—and what you should do when you meet them head on.

We do all in our power to provide for these days of excessive demand and be ready for them. We pack our lines with gas, store gas underground and liquefy it for condensed storage in big steel containers.

We do this in the periods when that gas is not needed. We put it away for when it will be needed. It is like saving against a rainy day—but before it starts to rain.

This summer we have doubled our underground storage facilities. In addition, we are increasing our liquefied natural gas storage capacity by almost doubling it. The new container, when completed, is expected to hold 120,000,000 cubic feet of gas in liquid form. Work on it is under way. Its completion date, of course is uncertain, but it is being rushed with all possible human diligence.

And of course we step *up* every possible *source* of gas supply.

All our efforts are directed to provide the greatest possible amount of natural gas for the war industries which need it. And so must your efforts, also, be directed to that same end. You are as much part of that war effort as we are.

Needless to say, the only way to be ready for peak days is to get ready *before* them. That applies to us as well as to you.

Here, therefore, are the things to do now in order to burn less gas next winter:

1. Insulate your house as much as you can, completely if it is possible.
2. Stop heat losses—by storm sash and door; weather stripping and caulking.
3. Have your heating plant gone over and put in order now.

Heating your house with the least possible amount of gas next winter is a wartime necessity. Prepare for it now.

THE EAST OHIO *Gas*

ATURAL GAS IS VITAL...

Use it Wisely!

Natural Gas is doing many important war jobs these days . . . in training camps, aircraft factories, munitions works, and scores of other war industries. Because Natural Gas is so essential to the nation's war effort, those who use it in their homes should be careful not to waste it. If you heat your home with Natural Gas, please use it wisely. You can do this by maintaining moderate temperatures, by making sure your windows are tight, by cutting off heat from unused rooms and bedrooms, by insulating your house where this is possible, by being careful not to leave doors or windows open. Remember—Natural Gas is the Victory Fuel. . . please don't waste it!

★ ★

PEOPLES NATURAL GAS CO.

HOW CAN I SAVE MORE WITH MY GAS WATER HEATER?

One of the 10 Questions most frequently asked by our customers.

Reading Time—45 Seconds

Gas is the precision fuel vitally needed to keep war plants running at top speed. Normally we could enlarge our facilities and meet all requests. Today, this is impossible.

These suggestions will help you conserve precious fuel for Uncle Sam and reduce waste of vital materials by making your Gas Water Heater last longer and save more.

1. Repair dripping faucets and save water and fuel.
2. Avoid washing hands, dishes or shaving with running hot water.
3. Insulate water tanks and pipes.
4. Turn gas off as soon as enough water is heated in any *non-automatic* water heaters.
5. Drain about a gallon of water from bottom of tank occasionally.

***Please Help** us conserve gasoline, tires and precious man hours for the urgent war jobs Uncle Sam asks us to do. Please call us for ser ice only when absolutely necessary.*

JERSEY CENTRAL POWER & LIGHT CO.

EACH STAR REPRESENTS ONE OF OUR MEN IN SERVICE

To help the busy railroads—

NO COKE FOR SALE

All the coke we manufacture must be used to make the extra gas we expect you will need this winter. This means we will have no coke for sale.

By using coke, we will require less coal. This will aid in solving the critical fuel transportation problem—help relieve the already over-burdened railroads and make more room for fast shipment of vital war materials.

Order your winter fuel surely now so your dealer can better plan his deliveries and conserve trucks, gasoline, tires and man hours. Do your part in conserving vital fuels by stopping heat leaks and drafts. Fuel is war material—use it wisely.

SOUTH CAROLINA ELECTRIC & GAS *Company*

Typical Gas Company Advertising Aids WPB Conservation Program

WASHINGTON CALLING

ABOUT GAS FOR ANOTHER WAR PLANT

BUY WAR BONDS
OR SALE AT YOUR GAS COMPANY OFFICE

Miraculous growth of war industry has placed tremendous demands on gas — the fuel most desired for many processes in the manufacture of war materials. When the building of a new plant or the expansion of an existing plant is planned in this territory, the War Production Board checks on the gas facilities available. Gas Company industrial engineers have been working long and diligently with WPB officials to make sure that gas will be on the job to meet all demands. Gas now enters the manufacturing process of practically every piece of war equipment made in this territory. From the same gas lines comes the fuel that efficiently and economically serves your home. That is why we ask you to use gas carefully in these critical times. Your cooperation helps speed the production that will speed Victory.

DOING DOUBLE DUTY

THE OHIO FUEL *Gas Company*

On Very Cold Days Reduce Your Use of Gas

When the temperature drops to 10 degrees or lower, the demand for Gas increases greatly.

War industries must not suffer from a lack of an adequate supply of Gas on these days. You can help keep them running and also cooperate with the Government's conservation program in the Detroit area by the following:

WHEN THE TEMPERATURE IS 10 DEGREES OR LOWER:

If you use Gas for househeating set your thermostat down 5 to 10 degrees.

DO NOT USE YOUR GAS RANGE TO PROVIDE HEAT.

Close off unused rooms to conserve every bit of heat.

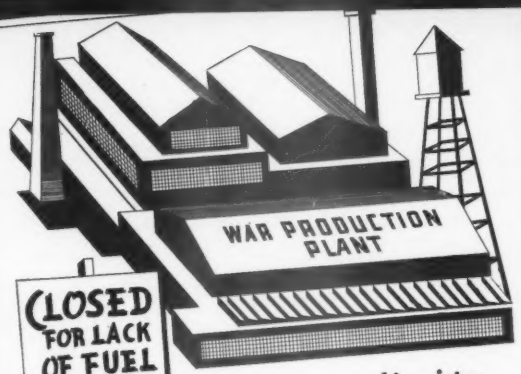
Keep doors and windows closed.

Wear warmer clothing in the house.

By carrying out these suggestions on those coldest days, you will help us maintain a plentiful supply of Gas for War industries.

•

MICHIGAN CONSOLIDATED GAS COMPANY



Let's not let this happen this winter

DON'T BE A "HEAT HOG"—SET YOUR THERMOSTAT AT 65 AND SAVE GAS

● HERE ARE WAYS TO SAVE FUEL

1. Don't keep your home over 65 for gases.
2. Close fireplace dampers if not in use.
3. Clogged radiators waste heat.
4. If you have a radiator, use it if you have children or elderly people in the family.
5. Be sure to close rooms not in use.
6. Replace dirty furnace fil ters.
7. Keep all windows and doors closed.
8. If you sleep with windows open, shut off heat and close them.
9. Insulate exposed heat pipes.
10. Install storm windows and doors.

INVEST 10% OF YOUR SALARY IN WAR BONDS

KANSAS CITY GAS CO.

What effect has the war on the supply of fuel gas in Southern California?

This winter the problem is to deliver the huge volume of gas needed in wartime—through a network of pipelines which was designed for peacetime.

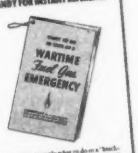
LIKE rubber, steel, aluminum and other essentials, natural gas is now an important war worker. So, until Victory, your gas company is pledged to keep essential war industry in uninterrupted production—even if this should make it necessary to ask our civilian customers to use less gas at certain times.

Fortunately the reserve supply of natural gas in Southern California and our delivery facilities are the greatest known in history—fully adequate, we think, barring certain temporary emergencies (such as extreme weather conditions) to take care of war-work as well as civilian requirements. However, the demand for gas in this area has grown and is still growing (new population . . . new war production) and this brings us to the fact that the vast network of steel pipe through which gas must travel to reach war industries and your home cannot be expanded—*because the steel required to do so is never readily available at other points!*

WHAT IS THIS LIKELY TO MEAN TO YOU?

You may be asked to use less gas for household heating during certain "peak-load" periods. The manner in which you could save gas and thereby help to reduce the "peak load" in such a possible emergency is described in a "Wartime Fuel Gas Emergency Manual" which is now being prepared for mailing. Your cooperation in such an emergency will be a war service of vital importance.

When your copy comes in the mail, KEEP THIS WARTIME MANUAL HANDY FOR INSTANT REFERENCE



You KNOW exactly what to do as a "back-seat" and how to cooperate in a "dimout" but suppose you're asked to use less gas for a short time (as you may be). Do you know how to do this with the least inconvenience to you and your family? To help you, this wartime emergency instruction manual is now being prepared and will be ready for mailing soon. It will tell you just what to do in case of any wartime fuel gas emergency.

SOUTHERN CALIFORNIA GAS COMPANY
SOUTHERN COUNTIES GAS COMPANY

GAS IS VITAL TO WAR PRODUCTION...USE IT WISELY — Buy United States War Bonds and Stamps

CONSERVE GAS
TO AID THE NATION'S WAR EFFORT

Use it for Essential Needs —But don't WASTE it!

YOUR gas company is prepared to see its customers through the war with essential gas services, subject to such limitations as those responsible for conserving the nation's resources may deem necessary because of the vital importance of gas in the war program.

From the time natural gas became available in Atlanta until recent months when materials required for further expansion became critical war materials, both the Atlanta Gas Light Company and its sister [illegible]

- Plan even meals, broiler meals and one-dish meals. (All save gas.)

In almost every cooking operation you can conserve gas by just being careful, and by planning economical ways to prepare meals.

In water heating—

Don't waste hot water! You are conserving gas when you don't let hot water [illegible]

Keep Your Gas Service Good by Using It Wisely!!

Please remember that the restrictions and limitations of wartime also affect your Gas Department. Like all other industries, your gas system is feeling the scarcity of skilled manpower, material shortages, and rising operating costs. Enlargement of gas manufacturing facilities, extensions of gas service, and even replacement of equipment have been curtailed for the duration. Only the most urgent emergency repairs can be made to gas plant or distributing system. Every possible precaution has been taken to ensure your continued good gas service during the war, despite these limitations. Omaha gas users can help keep their gas service good by using gas WISELY. Above all: don't waste it!

It is not likely that gas will be rationed as long as gas consumers use it wisely. By voluntarily regulating their own use of gas, customers may prevent the need for limitations which may be imposed by improvident and wasteful use of gas in wartime.

[illegible] in these many important war jobs these days . . . in training [illegible] works one ounce of other war [illegible] war effort.

How to heat your home with LESS fuel this winter!

Why fuel saving is so important:

It takes a tremendous amount of fuel to keep this nation's war industries going full time.

It takes an equally huge amount to heat all of our homes, to cook our meals and to supply our hot water.

And so—if there is to be enough fuel for every purpose each of us will have to use fuel far more economically than ever before!

The more fuel we save, the more we will help relieve the staggering load being carried by our transportation facilities—the more we will help release vitally needed train power for war production.

Saving fuel is a responsibility all of us must assume now, not some time in the future. It doesn't matter what you use—Gas, Oil, Electricity, Briquets, Coal, Wood or Kerosene. Every fuel is essential to the war effort.

And now are some money suggestions

The easy, practical way to save fuel is to save heat. From 15 to 40% of the average family's fuel is used to heat the outdoors, the chimney and unused rooms. The suggestions below will help you stop this waste.

How cold it will be this winter, no one can tell. But regardless of the temperature and the weather, the more thing—and the more thing—is to be constantly stingy with fuel and still comfortable with fuel.

Just save heat — and then your fuel will save itself!

Here are 12 easily-remembered ways for saving up to 40% of this winter's fuel:

GAS IS WAR MATERIAL Use it wisely!

PORTLAND GAS & COKE COMPANY

Determination of Coincident Peak Hour Demand for Combined Cooking and Water Heating Service

E. Henderson

H. V. Buffington

By E. HENDERSON
General Superintendent of Distribution
and
H. V. BUFFINGTON
Office Engineer, Rate and Appraisal Department Southern California Gas Company, Los Angeles, Calif.

ALTHOUGH the problem of economical design of gas distribution systems is not a new one, changed conditions within the past year have necessitated a different approach to the problem. Under war-time economy, it has become necessary to base design methods on cooking and water heating load expectancy rather than upon greater loads involving space heating in addition to the other factors.

As residential construction has become increasingly limited to war housing projects, the desirability for studying coincident peak hour demands for cooking and water heating service has been recognized with a view to determining whether commonly used design methods are applicable under the changed conditions. Since recent housing construction in Southern California has been largely in the field of small individual detached dwelling units, the study has been confined principally to this type of home.

Determination of coincident peak hour loads for distribution design in the company with which the authors are associated has been based on the formula:*

$$D_i = \frac{Q_r}{\text{Log } (16 + A)}$$

in which

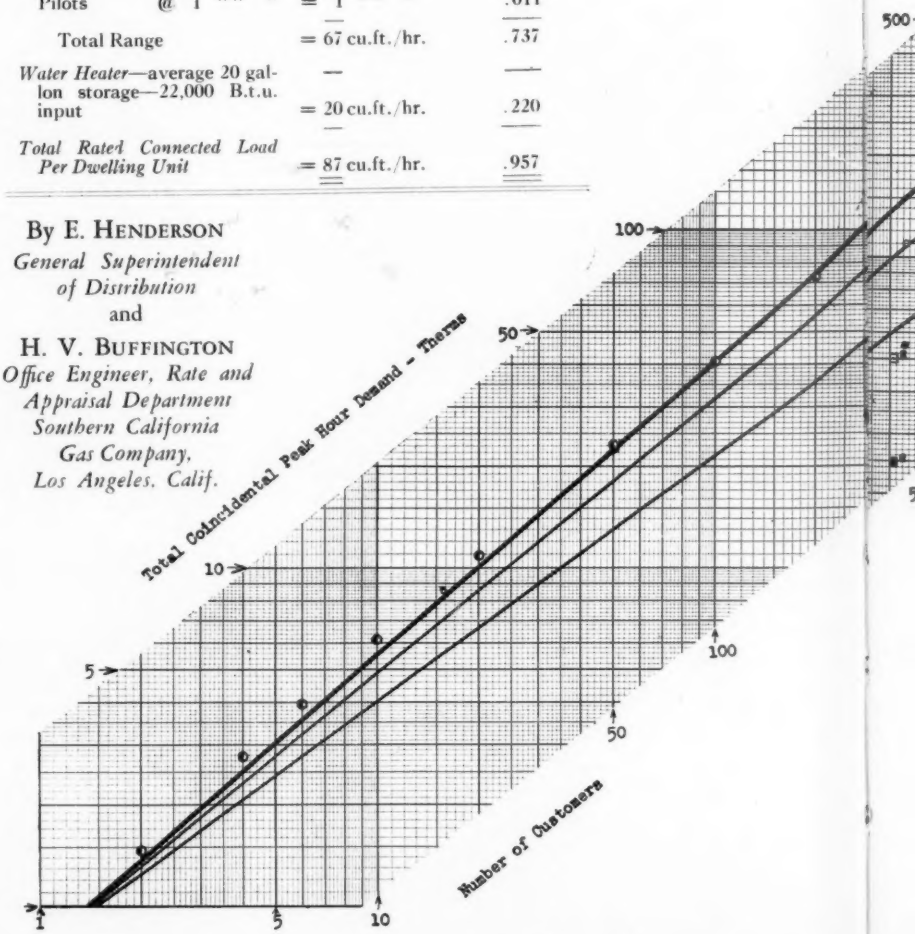
D_i = Coincident peak hour design load in cu.ft. per hour.
Q_r = Rated connected load in cu.ft. per hour.
A = Number of appliances producing Q_r.

* 1931 report of the Committee on Distribution Design of the Pacific Coast Gas Association.

Design loads obtained by this formula represent the probable maximum coincidental gas usage necessary to good distribution design.

In view of present conditions, a comparison of actual experience with design data for combined cooking and water heating coincident demand seemed highly desirable. To begin such a comparative study, design peak hour cooking and water heating loads were calculated, based on the assumption that each customer had a range and a twenty-gallon storage water heater which together represented a rated connected load of 87 cubic feet per hour per dwelling unit, determined as follows:

Range			*Therm Equivalents (1100 B.t.u. Gas)*
3 top burners	@ 9 cu.ft. each	= 27 cu.ft./hr.	.297
1 top burner	@ 12 " "	= 12 " "	.132
Oven	@ 27 " "	= 27 " "	.297
Pilots	@ 1 " "	= 1 " "	.011
Total Range		= 67 cu.ft./hr.	.737
Water Heater—average 20 gallon storage—22,000 B.t.u. input		= 20 cu.ft./hr.	.220
Total Rated Connected Load Per Dwelling Unit		= 87 cu.ft./hr.	.957



By substituting this load in the design formula, and using A = 2 (number of appliances per unit) times the number of dwelling units, the values shown in Table I were obtained for various numbers of units from 1 to 100,000.

From observation of the figures obtained it appeared that the calculated points might form a straight line on a log-log scale. Plotting of the points, however, show a slight deviation from a straight line, but for all practical purposes, a straight line (Curve 1—Figure I) lies within the required limit of accuracy. This affords a more simple method of comparison with experience data.

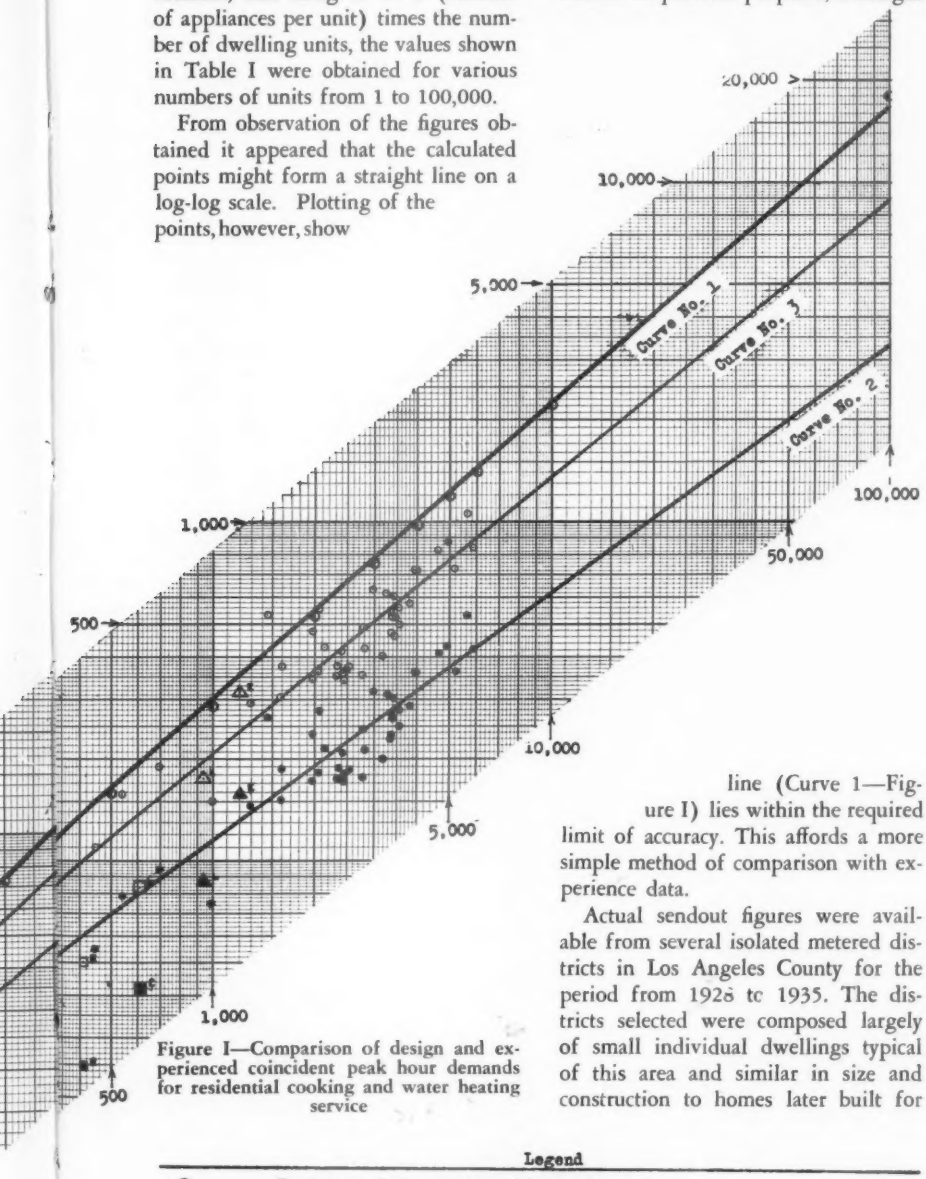


Figure I—Comparison of design and experienced coincident peak hour demands for residential cooking and water heating service

Actual sendout figures were available from several isolated metered districts in Los Angeles County for the period from 1928 to 1935. The districts selected were composed largely of small individual dwellings typical of this area and similar in size and construction to homes later built for war housing purposes. In order to compare cooking and water heating load experience with the calculated design data, it was assumed that the average consumption in these districts during the months of July, August and September represented summer cooking and water heating load only, since during these months, space heating is practically nonexistent. It is realized, of course, that the summer figures probably include some refrigeration and other incidental load. However, it is believed that the effect of this additional load is probably offset by the fact that during these same months, some customers spend vacations away from home.

Data From Metered Districts

The data obtained from these metered districts is shown in Table II. The therm equivalents of the average coincident demands per customer were calculated by multiplying the demands in cubic feet by 0.011, the conversion factor for the 1100 B.t.u. natural gas distributed in this area. Total coincident demand for each district, in therms was plotted against the number of customers in that district and Curve 2—Figure I was constructed to coincide with the design load for one cus-

Legend

◐ - - - Design Load for Maximum Winter Demand
● - - - Summer Experience in Metered Districts
○ - - - Winter Demand Computed from Summer Experience

Defense Housing Projects Composed Primarily of Single Residences:

▲L - - - Summer Experience - Lakewood Village
▲E - - - Summer Experience - City of El Segundo
△L - - - Winter Demand Computed from Summer Experience - Lakewood Village
△E - - - Winter Demand Computed from Summer Experience - El Segundo

Multiple Unit, Low Rent, Housing Projects

■R - - - Summer Experience - Ramona Gardens Housing Project
■C - - - Summer Experience - Carmelita Housing Project
□R - - - Winter Demand Computed from Summer Experience - Romana Gardens Housing Project
□C - - - Winter Demand Computed from Summer Experience - Carmelita Housing Project

TABLE I

DESIGN PEAK HOUR LOAD IN THERMS FOR RESIDENTIAL COOKING AND WATER HEATING SERVICE OF 1100 B.T.U. NATURAL GAS

Number of Dwelling Units	*Design Peak Hour Load per Dwelling Unit* — *Cu.ft. 1100 B.t.u.*	*Therm Equiv.*	*Total Therms/hr.*
1	69.3	0.762	.762
2	67.0	0.737	1.474
4	63.0	0.693	2.772
6	60.2	0.662	3.972
10	55.9	0.615	6.150
20	49.8	0.548	10.960
50	42.2	0.464	23.200
100	37.3	0.410	41.000
200	33.2	0.365	73.000
500	28.9	0.318	159.000
1,000	26.3	0.289	289.000
2,000	24.1	0.265	530.000
3,000	23.0	0.253	759.000
4,000	22.3	0.245	980.000
5,000	21.7	0.239	1195.000
6,000	21.3	0.234	1404.000
10,000	20.2	0.222	2220.000
100,000	16.4	0.180	18000.000

TABLE II

STATISTICS OF SENDOUT THROUGH METERED DISTRICTS PRINCIPALLY FOR RESIDENTIAL COOKING AND WATER HEATING SERVICE

		JULY		AUGUST		SEPTEMBER		TOTAL		AVERAGE			
Dist's.	Year	No. of Cust.	Peak Demand per Cust. cu.ft./hr.	No. of Cust.	Peak Demand per Cust. cu.ft./hr.	No. of Cust.	Peak Demand per Cust. cu.ft./hr.	No. of Cust.	Peak Demand per Cust. cu.ft./hr.	No. of Cust.	Peak Demand per Cust. cu.ft./hr.	Peak Demand per Cust. Therms/hr.	Av. Summer Peak Demand per District Therms/hr.
A	1928	2,902	10.3	3,011	9.2	...	...	5,913	19.5	2,957	9.8	.108	319
	1929	3,544	7.2	...	...	...	...	3,544	7.2	3,544	7.2	.079	280
	1930	...	...	3,932	8.4	...	...	3,932	8.4	3,932	8.4	.092	362
	1932	3,908	7.5	3,979	8.3	3,998	9.1	11,885	24.9	3,962	8.3	.091	361
B	1935	1,968	12.6	1,972	9.4	1,989	11.1	5,929	33.1	1,976	11.0	.121	239
C	1928	2,443	6.3	2,425	6.3	2,450	7.5	7,318	20.1	2,429	6.7	.074	180
	1929	2,529	5.6	2,522	5.7	2,534	8.8	7,585	20.1	2,528	6.7	.074	187
	1934	2,798	6.9	...	...	...	...	2,798	6.9	2,798	6.9	.076	213
D	1928	3,294	8.0	3,310	7.7	3,228	10.1	9,832	25.8	3,277	8.6	.095	311
	1929	3,806	6.9	...	...	...	...	3,806	6.9	3,806	6.9	.076	289
	1931	...	...	4,594	7.1	4,631	9.0	9,225	16.1	4,613	8.1	.089	411
	1934	...	...	4,900	7.8	4,960	8.2	9,860	16.0	4,930	8.0	.088	434
E	1928	2,397	7.6	2,386	7.1	2,426	8.9	7,209	23.6	2,403	7.9	.087	209
	1929	...	...	2,482	6.7	...	...	2,482	6.7	2,482	6.7	.074	184
F	1928	1,260	10.1	1,292	10.0	1,318	11.1	3,870	31.2	1,290	10.4	.114	147
	1929	1,440	17.0	1,462	16.6	...	...	2,902	33.6	1,451	16.8	.185	268
	1930	...	...	...	...	1,594	10.7	1,594	10.7	1,594	10.7	.118	188
G	1928	2,305	7.1	2,312	6.5	2,337	7.2	6,954	20.8	2,318	6.9	.076	176
	1929	2,327	7.6	2,334	6.8	2,353	7.7	7,014	22.1	2,338	7.4	.081	189
	1931	2,433	5.3	2,433	5.8	2,442	8.0	7,308	19.1	2,436	6.4	.070	171
H	1928	1,956	8.0	1,958	7.1	1,986	8.9	5,900	24.0	1,967	8.0	.088	173
	1928	2,033	6.5	2,041	5.9	2,058	11.9	6,132	24.3	2,044	8.1	.089	182
I	1929	3,376	6.0	3,365	5.9	3,384	10.3	10,125	22.2	3,375	7.4	.081	273
	1930	3,420	6.8	3,376	6.3	3,454	11.0	10,250	24.1	3,417	8.0	.088	301
	1932	3,442	6.1	3,463	6.6	3,485	7.9	10,390	20.6	3,463	6.9	.076	263
J	1929	1,577	8.3	1,583	6.3	1,604	11.6	4,764	26.2	1,588	8.7	.096	152
K	1928	2,842	9.3	2,818	7.0	2,717	7.7	8,377	24.0	2,792	8.0	.088	246
	1929	2,772	5.8	...	...	...	...	2,772	5.8	2,772	5.8	.064	177
	1931	...	...	3,329	5.4	3,324	7.2	6,653	12.6	3,327	6.3	.069	230
	1932	3,409	5.6	3,373	6.4	3,321	7.2	10,103	19.2	3,368	6.4	.070	236
	1934	3,392	6.5	3,368	6.4	3,411	8.5	10,171	21.4	3,390	7.1	.078	264
L	1928	426	11.0	452	10.6	458	12.4	1,336	34.0	445	11.3	.124	55
	1929	532	12.6	536	13.3	550	14.1	1,618	40.0	539	13.3	.146	.79
	1930	681	11.0	...	...	713	13.8	1,394	24.8	697	12.4	.136	95
	1932	987	6.1	980	6.8	1,003	7.8	2,970	20.7	990	6.9	.076	75
M	1929	3,180	5.7	...	...	...	...	3,180	5.7	3,180	5.7	.063	200
N	1930	5,209	6.4	5,208	6.3	...	...	10,417	12.7	5,209	6.4	.070	365
	1933	...	...	...	...	5,618	8.6	5,618	8.6	5,618	8.6	.095	534
	1935	5,852	7.0	5,840	5.9	5,909	6.6	17,601	19.5	5,867	6.5	.072	422
O	1931	2,107	7.9	2,128	8.1	2,171	11.5	6,406	27.5	2,135	9.2	.101	216
	1933	...	...	...	...	2,054	12.4	2,054	12.4	2,054	12.4	.136	279
P	1934	3,562	6.2	3,559	6.2	3,585	6.7	10,706	19.1	3,569	6.4	.070	250

tomer, where diversity in demand is slight, and to pass through the center of gravity of the group of points plotted from the experience data.

The considerable difference apparent between Curves 1 and 2 is due to the fact that the experience data were for the summer months only, and the curve based on these figures naturally represents only the average lower limit of cooking and water heating experience. The answer to the problem of determining the amount by which this lower experience curve should be raised or revaluated to represent average winter peak experience is different for each general locality, and is dependent upon water and air temperature variation and customer living habits.

In Southern California, kitchens are usually not provided with sources of heat other than the range oven. Consequently, during the winter, the use of ranges is known to increase out of proportion to the amount of cooking actually done. Additional winter use of ranges is also due partly to the larger number of hot meals prepared during cooler weather.

Laboratory tests conducted by the Natural Gas Bureau in Los Angeles in 1937 indicated that fuel consumption in a 20-gallon automatic storage water heater with a daily draw-off of 55 gallons, is approximately 25% greater in the winter than in the summer. This figure, of course, is approximate only, and would vary considerably with changing air and water temperatures. It should be borne in mind that the 25% figure was determined under laboratory conditions. Field studies indicate a considerably higher value, probably due to high heat losses from long pipe runs and to greater stand-by losses from the heaters in exposed locations prevalent in this area.

The foregoing discussion of differences between summer and winter cooking and water heating load presents no concrete basis for revaluating the lower experience curve, but is presented simply to point out some of the more precise reasons why such a revaluation must be made to gain a real comparison of design and experience loads.

In order to obtain a basis for revaluating Curve 2, studies were conducted, over a period of one year to determine monthly consumption in residences where such usage was for cooking only and for water heating only. Of the seventy-seven customers living in individual detached residences who were surveyed, sixty-six used gas for cooking only, while eleven used gas for water heating only. The results of the survey of these customers, shown in Table IV, indicate that the increase in winter over summer cooking and water heating usage is 100% in the Southern California area.

Because the number of individual residential customers surveyed was relatively small, and because there was some question as to whether apartment dwellings would show the same percentage of increase, winter over summer, a second survey was made during 1941-1942 among 4,268 customers living in apartments. Of these customers, 2,867 used gas for cooking only, while 1,401 used gas for water heating only. The results of this survey, shown in Table V, confirmed the

100% revaluation figure previously determined for individual detached residences. The average increase in winter over summer usage for the apartments was 101%.

With the validity of the 100% revaluation figure fairly well established, the load values obtained from the metered districts and shown on Curve 2 were increased by this amount (Table III). Curve 3 which was then constructed in the same manner as Curve 2, represents the expected average of winter peak cooking and water heating load, based on the summer experience for the same type of demand. From the three curves shown, it is apparent that the theoretical design curve forms approximately the upper envelope of the points on the expected average winter peak curve. Since design naturally would be based on the probable maximum load condition, the close relationship between theoretical and maximum adjusted experience values seems to justify the location of the design curve.

Typical Small-Home Areas Studied

Since the original data were for coincident demands during 1928-1935, it was thought that subsequent changes in the nature of appliances installed and in the living habits of the customers might have altered the usefulness of the values obtained. Similar data for two other isolated districts were therefore secured for more recent periods. One of these two districts was the City of El Segundo, which is populated largely by employees of the major oil company which operates a refinery near the town. The other district, the Lakewood Village area of Los Angeles County is in close proximity to one of the larger aircraft plants. Both of these communities are typical of the major portion of small home projects constructed in Southern California.

Results of the surveys of these two developments were plotted on Figure I and were found to lie very near to the points obtained from the previous survey of other similar areas, indicating that the usefulness of the earlier data has not been adversely affected by changed conditions.

During the past few years, several low rent, multiple unit housing projects have been constructed in this locality. Since a comparison of the data in Tables IV and V disclosed that gas usage for cooking and water heating in apartments averaged between ten and twenty per cent less than in individual detached dwellings, a survey was conducted, as a matter of interest, to determine the average cooking and water heating usage in two of the low-cost multiple unit projects. The two projects selected were Ramona Gardens near Los Angeles and Carmelita Housing Project near Long Beach, both of which are supplied through master meters. These communities were constructed as so-called "slum clearance" projects and obviously are not typical of residential districts in this area. As was to be expected, consumption was found to be considerably lower than for comparable numbers of individual detached dwellings. Usage in the Ramona Gardens units was especially low because of restrictions imposed by individual check meters.

The method of calculation of probable winter cooking and water heating demand from experienced average summer demands, as discussed in this article we believe to be sound. The fact should be borne in mind, however, that careful study must be made of the actual relationship between summer and winter cooking and water heating peaks in any particular area before such relationship can be applied to the area in general. The 100% revaluation factor which seems to apply in Southern California may be

TABLE III

SUMMER COOKING AND WATER HEATING DEMAND REVALUATED FOR WINTER CONDITIONS

		Average			
Dist's.	*Year*	*No. of Cust.*	*Demand per Cust. cu.ft./hr.*	*Total Hourly Demand per District Therms (Summer)*	*Total Hourly Demand per District Therms (Winter=Summer+100%)*
A	1928	2,957	9.8	319	638
	1929	3,544	7.2	280	560
	1930	3,932	8.4	362	724
	1932	3,962	8.3	361	722
B	1935	1,976	11.0	239	478
C	1928	2,429	6.7	180	360
	1929	2,528	6.7	187	374
	1934	2,798	6.9	213	426
D	1928	3,277	8.6	311	622
	1929	3,806	6.9	289	578
	1931	4,613	8.1	411	822
	1934	4,930	8.0	434	868
E	1928	2,403	7.9	209	418
	1929	2,482	6.7	184	368
F	1928	1,290	10.4	147	294
	1929	1,451	16.8	268	536
	1930	1,594	10.7	188	376
G	1928	2,318	6.9	176	352
	1929	2,338	7.4	189	378
	1931	2,436	6.4	171	342
H	1928	1,967	8.0	173	346
	1929	2,044	8.1	182	364
I	1929	3,375	7.4	273	546
	1930	3,417	8.0	301	602
	1932	3,463	6.9	263	526
J	1929	1,588	8.7	152	304
K	1928	2,792	8.0	246	492
	1929	2,772	5.8	177	354
	1931	3,327	6.3	230	460
	1932	3,368	6.4	236	472
	1934	3,390	7.1	264	528
L	1928	445	11.3	55	110
	1929	539	13.3	79	158
	1930	697	12.4	95	190
	1932	990	6.9	75	150
M	1929	3,180	5.7	200	400
N	1930	5,209	6.4	365	730
	1933	5,618	8.6	534	1,068
	1935	5,867	6.5	422	844
O	1931	2,135	9.2	216	432
	1933	2,054	12.4	279	558
P	1934	3,569	6.4	250	500

highly erroneous where climate and living conditions are different. Facts seem to prove however, that the method of design which has previously been used and which has been discussed in this article applies to diversity of cooking and water heating demands as well as to total usage which could be expected under peace time conditions.

TABLE IV

CUBIC FOOT SALES PER CUSTOMER TO INDIVIDUAL DETACHED RESIDENCES—L. A. COUNTY

Year Ended 6–30–39	(1) 66 Cust. Ranges Only	(2) 11 Cust. Auto. Wtr. Heater Only	(3) 77 Cust. Range and Automatic Water Htrs. (Summary of Columns 1 and 2)	Therm Equivalent	Mean Monthly Air Temp. °F.
Jan. 1939	2,430	3,136	5,566	61.2	57.0
Feb. "	2,491	3,318	5,809	63.9	54.0
Mar. "	2,261	3,127	5,388	59.3	56.8
Apr. "	1,768	2,627	4,395	48.3	63.0
May "	1,477	2,309	3,786	41.6	63.6
June "	1,333	1,882	3,215	35.3	66.9
July 1938	1,332	2,000	3,332	36.7	69.6
Aug. "	1,089	1,818	2,907	32.0	73.9
Sept. "	1,117	1,773	2,890	31.8	74.0
Oct. "	1,217	1,945	3,162	34.8	66.7
Nov. "	1,580	2,391	3,971	43.7	62.7
Dec. "	1,945	2,591	4,536	49.9	62.3
Total	20,040	28,917	48,957	538.5	
Average	1,670	2,410	4,080	44.9	
Feb.	2,491	3,318	5,809	63.9	
Av. of Aug. and Sept.	1,103	1,796	2,899	31.9	
Difference	1,388	1,522	2,910	32.0	
% Inc. Winter over Summer	126%	85%	100%	100%	

TABLE V

CUBIC FOOT SALES PER APARTMENT TO APARTMENT HOUSES—LOS ANGELES COUNTY

Year Ended 7–31–42	(1) 2,867 Apts. Ranges Only	(2) 1,401 Apts. Water Heaters Only	(3) 4,268 Apts. Range and Water Heaters (Summary of Columns 1 and 2)	Therm. Equivalent	Mean Monthly Air Temp. °F.
Jan. 1942	1,566	3,003	4,569	50.3	58.6
Feb. "	1,332	2,622	3,954	43.5	55.7
Mar. "	1,497	2,672	4,169	45.8	58.8
Apr. "	1,309	2,294	3,603	39.6	59.4
May "	1,232	2,128	3,360	37.0	62.8
June "	999	1,801	2,800	30.8	65.9
July "	906	1,648	2,554	28.1	71.8
Aug. 1941	767	1,540	2,307	25.4	71.1
Sept. "	756	1,482	2,238	24.6	68.0
Oct. "	850	1,704	2,554	28.1	66.0
Nov. "	1,090	2,017	3,107	34.2	65.4
Dec. "	1,232	2,434	3,666	40.3	57.0
Total	13,536	25,345	38,881	427.7	
Average	1,128	2,112	3,240	35.6	
Jan.	1,566	3,003	4,569	50.3	
Av. of Aug. and Sept.	762	1,511	2,273	25.0	
Difference	804	1,492	2,296	25.3	
% Inc. Winter over Summer	105%	99%	101%	101%	

L-31 and L-174 Tightened

WAR PRODUCTION BOARD tightened control over the delivery of natural and manufactured gas by revising on November 13 Limitation Order L-31 governing natural and mixed gas and Limitation Order L-174 governing manufactured gas.

"This action was taken because of the increasingly serious gas situation," said Herbert S. Marks, Acting Chief of the WPB Power Branch. "The situation in many areas has become alarming. The use of gas is showing great increases as compared to last year. At the same time critical materials are not available for pipelines and gas manufacturing equipment with which to meet the increased demand, and the fuel oil shortage will also affect the ability of gas companies to meet requirements. While the revised orders will help us meet this situation, it is of utmost importance that domestic users of gas practice the strictest economy in the operation of gas furnaces and other gas-heating appliances. The only alternative to effective voluntary curtailment now is drastic compulsory curtailment when the weather turns cold."

Mr. Marks emphasized that the revised orders are not in themselves adequate to prevent shortages in many areas, and that supplementary orders and directives dealing with particular localities will be required from time to time.

Principal changes in the orders were outlined in the November 20 A. G. A. Information Service Letter which has been distributed to company members.

Biddison Joins WPB

P. M. Biddison

P. McDONALD BIDDISON, consulting engineer for Lone Star Gas Company, Dallas, Texas, since 1931, left for Washington, D. C., October 17, after accepting an appointment as consultant in the Power Branch of the Gas Supply Section, War Production Board.

An expert on valuation and rate cases of natural gas utilities, Mr. Biddison has made many valuable contributions to meetings of the American Gas Association of which he is a member. He is a graduate of the Kansas State College of Agriculture and Applied Science and received his B.S. in electrical engineering.

During 1917-'18, he served as a consulting engineer on war gases for the U. S. Bureau of Mines and in this capacity conducted a search for helium in natural gas in all fields in the United States. He also supervised construction of two helium plants in North Fort Worth and one in Petrolia.

Bicycle Operation During the War

By James H. Motz,*
Member A. G. A. Accident Prevention Committee

THE experience summary covered in this report is from twenty-three property locations, comprising three consolidated property groups. A total of seventy-nine bicycles are now being used. Four consolidated property groups report they are using no bicycles except for office-to-plant mail and inter-department messenger service. These limited uses have been in effect for a number of years prior to the present emergency, and no consideration has been given in these four groups, up to this time, to extending the use of bicycles as the result of rationing of rubber and gasoline.

In the twenty-three locations covered by this report, it was found that already there has been some declining use of bicycles. The apparent reasons for such declining use will be discussed later herein. It is our opinion that the attempted enlarged use of bicycles is probably premature, but that their use will increase from time to time as gasoline and tires become scarcer.

Used by Meter Readers and Collectors

Bicycles can be used, and are now being used by skip meter readers, collectors, service men under certain limited conditions, and by district representatives. Skip readers can use bicycles because of the distances between stopping points, whereas regular meter readers cannot because their calls are made from house to house or such similar short distances, and thus require more walking than riding. Collectors can use bicycles for the same reason that district representatives find them of practical value. Service men who are employed only on turn-ons and turn-offs, or who are equipped with light tool kits for minor adjustments, can use bicycles to some advantage. But where heavy tools or fittings are required to be carried, such use is out of the question. The district representative plan permits use within certain limits; and for such work, bicycles are probably used more regularly than for any other, for the reason that district representatives are not required to carry heavy tools, and their stops are far enough apart to justify using bicycles between calls.

In most cases, however, it was surprising to learn that street cars and buses are still preferred for transportation between service calls for the reasons that (a) with use of cars and buses, traffic safety is not a personal problem; (b) slight hills and rough streets offer objection to use of bicycles, and (c) in rainy, windy weather, employees prefer to be on foot, where buses and street cars are not available. In this connection, it should be noted that several of the companies who reported to your committee operate in Florida, where most of the territory is comparatively level, and an increasing tendency towards the use of bicycles in that State was observed.

Almost without exception, the companies reporting state that bicycles were found to be used principally for transportation to and from work rather than for transportation on the job. Salesmen (most of whom are employed on survey work rather than in actual selling) do not use bicycles between calls. Three companies furnished their salesmen with bicycles but asked for their return when almost total non-use for business purposes was discovered. It is believed that if and when gasoline rationing becomes more acute and existing tires are no longer usable for personal convenience, there will be a tendency towards the use of bicycles in this type of work.

So far as the possibility of accident is concerned, no basis for comparison is available for the reason that no single accident involving a bicycle operated by an employee has been reported. Several near-accidents were reported, which cases arose only where traffic rules were ignored. It is believed that so far as a possibility of danger is concerned, traffic hazards are diminishing for the reason that fewer automobiles are on the streets, and both motorist and bicyclist are becoming used to increased bicycle riding. In the three property groups using bicycles, employees have been cautioned against suggesting or making any variation from regular traffic rules; except that on rural highways, recommendations have been made (contrary to generally recognized safety rules) that the left side of the highway be used. This conforms to the same instructions for pedestrians in the rural areas, which as we appreciate lessens the possibility of accident, despite the fact that it is contrary to urban traffic rules.

Wartime transportation

In summing up the experiences of those companies canvassed, it is our opinion that (1) bicycles can be used successfully for certain limited work; (2) they will be used more when gasoline and tire rationing become more acute, *but* (3) the practical use of bicycles is definitely limited to level country and fair weather.

Three individual cases have been reported where physical disability resulted following attempted use of bicycles by those of mature years. Older persons who are not accustomed to the pedaling and the attendant physical strain are particularly warned against using bicycles as a substitute means of transportation.

The recommendations made in this article are, of course, subject to consideration in connection with local and State rules and regulations.

* Atlanta Gas Light Company, Atlanta, Georgia.

Two features of current home service activities—Above, the nutrition center and, right, a Food for Fitness demonstration

Wartime Extras . . . *Contributed by a Large Utility Home Service Department*

THE war has broadened home service activities in many utility companies. Customers are looking to the utility for leadership and direction in meeting the problems of food rationing, appliance conservation, and information concerning nutrition.

Cognizant of these problems, the home service activities of the Public Service Electric and Gas Company of New Jersey are geared for an "all out job" on the home front.

The major war activities of home service in Public Service are divided into four classifications:

1. Nutrition and Conservation Center
2. Nutrition Program for Homemakers
3. Home Economics News
4. Newspaper Advertising

Cover design of booklet written for war workers

Nutrition and Conservation Center

On the sales floor of each district office, of which there are twenty-six, Public Service has erected a booth which is known as the Nutrition and Conservation Center. This center is staffed at all times by the home service consultant or sales department attendants.

Since the subject of nutrition is one with which very few people have a conversational knowledge, a one-day training session was given to those employees, other than the home service consultant, who were to staff the booth.

It was felt that since the purpose of the center is to disseminate information on nutrition and appliance conservation, those staffing the center should be familiar in a general way with these subjects.

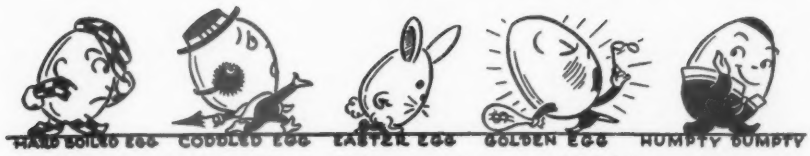
Questions of a complex nature involving either appliance care or nutrition are handled by taking the name and address, and forwarding the query to a responsible person for follow up. In the case of nutrition, this would be the home service consultant; and appliance care would be taken care of by the service representative or the appliance sales manager.

Several booklets and pamphlets are distributed from the center, the most popular of which is the Pack-A-Lunch for Victory.

This booklet consists of sixteen pages and is colorfully printed in red and blue on white paper. It stresses the correct lunch box pattern, gives a list of nutritious sandwich fillings and sandwich spreads, recipes and instructions for carrying hot foods, and easy-to-pack desserts. Also covered are menus for the "swing shifter" and tips on lunch box packing.

The Pack-A-Lunch for Victory booklet is written for the war worker, but

Sketch from inside page of "Pack-A-Lunch for Victory"



Sketch in "Home Economics News" which accompanies a page of helpful suggestions concerning the use of eggs as a good meat substitute

is useable for school lunches or lunch at home. It is being distributed on request only. So well has this been received that several war plants in Public Service territory have requested copies for their entire personnel.

Other booklets that are distributed from the center are the Servel Nutrition Guide, Meal Planner, and Defense Manual. The pamphlet Eat the Right Food, a nutrition piece issued by the Bureau of Home Economics of the United States Department of Agriculture, is also used. And since Public Service is a combination company, five booklets dealing with the care of electric appliances are also to be found at the center.

Nutrition Program for Homemakers

In cooperation with the National Nutrition Program, Public Service is sponsoring nutrition courses for the wives, mothers, and daughters of war workers.

This program is known as "Food for Fitness" and comprises four lecture-demonstrations that treat a 'round the clock discussion of food habits. It is simple, non-technical, "down to earth" nutrition.

In operation, Food for Fitness is brought to an industrial area. Experience to date has shown that the high school auditorium makes an ideal meeting place. It is usually centrally located, has the necessary working facilities, and is known.

When the location and dates have been selected, co-sponsorship is sought. Local agencies of the Red Cross, Office of Civilian Defense, and other groups who are nutrition-minded have proved willing and helpful in aiding the program.

The task of securing a representative audience is the next and greatest problem. In order to reach the wives, mothers, and daughters of war workers, the cooperation of plant management, having employees living in the area, is requested. Experience once again has shown that it is difficult to reach the proper plant official to make a personal presentation of the program. Public Service has solved this by preparing a booklet that in short, simple paragraphs outlines the plan. This booklet is sent with a personal letter of transmittal to the proper plant official. This method of approach has brought the desired results.

Full plant cooperation consists of mailing a letter to the wife, mother, or daughter, on the letterhead of the company, and signed by an official of the company. This is a letter of invitation and gives the necessary information for attendance. The second phase is the time card stuffer. This is an announcement that is placed in each worker's time rack the day before the program is scheduled to begin. Supplementing the letter and time card stuffer is a poster for the plant bulletin boards which is a formal announcement of Food for Fitness.

A printed program is distributed at each session which contains a digest of the lecture, the recipes used, and marketing information. At the final session each person in attendance is given a Certificate of Merit for having completed the sessions. This certificate is a dressed up version of the Government food chart outlining the eight basic foods, as issued by the Office of Defense Health and Welfare Services.

Nutrition-slanted advertisement supports home service program

Home Economics News

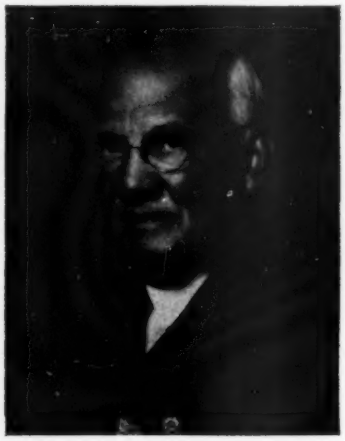
The Home Economics News, strictly speaking, is not a war baby. It had its birth some years ago as a single sheet containing a few recipes, with a very limited circulation. Its real growth, however, was attained after Pearl Harbor.

The Home Economics News today is a six-page sheet with a circulation approaching 100,000, and is issued every two weeks. It is circulated mainly through the Nutrition and Conservation Centers, with a limited number

(Continued on page 468)

"Down-to-earth" nutrition is the keynote of these popular pamphlets. Home Economics News has almost 100,000 circulation

F. H. Payne, American Meter Head, Dies



Francis H. Payne

FRANCIS HERVEY PAYNE, for 51 years manager of the Metric Metal Works Plant at Erie, Pa., and president of the American Meter Company, died November 10. He was in his seventy-fifth year and had been a part of important manufacturing history in the measurement of gas and oil during his more than half a century in the utility manufacturing business.

A graduate of Princeton University, Mr. Payne was born April 1, 1868 at Petroleum Center, Venango County, Pa., where his father, the late Calvin N. Payne, was engaged in drilling for oil and built the first natural gas pipe line in America. His advent in the gas meter business was in July, 1891, when he became secretary and manager of the Metric Metal Company which later became a part of American Meter Company.

Mr. Payne was a director of American Meter Company for many years prior to his election as vice-president in 1923, and as president, in June, 1936. Active in civic and national utility affairs, at the time of his death he was a director of the American Gas Association, the Erie Chamber of Commerce, and the Erie County Health & Tuberculosis Association, and president of the Board of Library Trustees, Erie. He was a director of the First National Bank of Erie for many years, chairman of the board of the National Bank and Trust Co., and member of many clubs and organizations.

Mr. Payne is survived by his widow, Mrs. Myra Lee Payne, and two sons, F. Dana and Calvin N. Payne II, also by a sister, Mrs. Axtell J. Byles, and a brother, Christy, who, before his retirement was treasurer of the Standard Oil Co. of New Jersey.

H. B. Taylor Is Dead

H. B. TAYLOR, of Jackson, Mich., secretary and general sales manager of the Handley Brown Heater Company, manufacturers of gas water heaters and conversion burners, died October 17.

A veteran of the first World War, Mr. Taylor was born in Lafayette, Ind., and educated at Purdue University. Prior to joining the Handley organization, he was employed by the Consumers Power Co., International Harvester Co., and J. B. Timberlake & Son.

Mr. Taylor had been active in the business and civic life of Jackson, having been one of the organizers and first president of the Junior Chamber of Commerce, vice-president of the Rotary Club and member of the American Legion. He was a member of the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers.

W. J. Hinchey, Natural Gas Pioneer, Dies

WILLIAM J. HINCHEY, vice-president and general manager of the Kentucky Natural Gas Corporation, Owensboro, Ky., died November 1, bringing to a close an outstanding career that spanned 44 years in the gas business. He was 62 years of age.

Mr. Hinchey was a member of that small group of pioneer natural gas men whose intensive interest in producing, transporting and selling this fuel was largely responsible for the tremendous growth and present stature of the industry. He became a member of the old Natural Gas Association of America a few years after it was organized and continued until his death as a member of its successor, the Natural Gas Section of the American Gas Association.

Mr. Hinchey's father helped construct one of the first natural gas lines in America, between Pennsylvania and New Jersey. Following in his father's footsteps, Mr. Hinchey started his career in the gas business at Bradford, Pa., in May 1898, with the Commercial Gas Co., doing general service work. Eight years later he was transferred to the United Natural Gas Pipe Line Co. of Bradford, and in the fall of 1908, he joined the Kansas Natural Gas Co., at Independence, Kans., as chief inspector of pipe lines and distribution systems. When this company was taken over by the Cities Service Co., he remained until 1922 as chief inspector of all the system's properties in the Kansas City district. He then became general superintendent of the Union Public Service Co., and continued until 1929 with Henry L. Doherty Company as general superintendent of all distribution properties of the Gas Service Co., when Doherty purchased Union Public Service.

In 1929, Mr. Hinchey resigned to join the Missouri Kansas Pipe Line Co., as vice-president and general manager of the Kentucky Natural Gas Co., at Owensboro. A few years later this company was reorganized as the Kentucky Natural Gas Corp., and he remained as vice-president and general manager, thus completing 44 years in the industry. Mr. Hinchey not only brought natural gas to Owensboro on July 15, 1929, but later extended the company's lines to 60 other communities in Kentucky, Illinois, and Indiana.

He was active in civic affairs and was greatly loved and respected for his unselfish community service.

The Value of Conventions

(Editorial in *Gas Age*, October 22)

Reports from men and women who attended the streamlined war meeting of the American Gas Association are unanimous in approval of the program, spirit and results of the two-day convention. All of the 800 delegates and guests carried away facts, figures and impressions that will be of value immediately and for months to come.

In the face of difficulties—extreme demands on all gas company executives' time and energy, war-time restrictions on travel, crowded hotels, etc.—the Chicago gathering again proved the value of the industry's association and its annual convention.

As we stated on this page in our last issue, we must all "keep in mind the speed at which we are rushing forward today." A two day national summing-up was all the more essential for straight thinking and coordinated action.

The meeting offered an opportunity for gas industry leaders to report on vital programs. It also provided to Government officials a forum where they could easily and quickly inform the responsible executives of Federal desires and intentions.

Most important warnings issued at the convention were concerned with rapidly impending shortages of materials and man power. All-out war will exact its all-out toll, even in highly essential industries such as the gas utility business. Executives who heard the warnings at Chicago are much better prepared to plan for the future.

Gas War Research . . . *A Program of Industrial and Commercial Development*

By JOHN W. BATTEN*

Chairman, Committee on Industrial Gas Research

John W. Batten

THE question of the necessity—not to say the desirability—of our industry engaging in a program of active research is not debatable. Not our country alone but the entire civilization of which we are a part, is committed to it to the same extent that we as a world are committed to the desirability of constant improvement in our way of life and our standard of living.

It may become necessary from time to time, possibly in emergency conditions like the present, to divert our attention and our interest from the long range view which research fundamentally and basically takes to concentration upon problems and tasks, which, if not dealt with promptly and adequately, would destroy completely that civilization—an entity so much more important than any single element composing it. Like the Western pioneer, we may at times be called upon to abandon temporarily the plow to pick up the musket. For him, business as usual was out until the immediate danger to life was removed.

Fortunately, there appears to be, in the judgment of most of us, still an opportunity not only to glance hopefully to the future, not only to make some plans as to what we will do and how we will carry on when these dangerous days are done, but to actually do something about that future.

The Committee on Industrial Gas Research of this Association is continuing to carry on a research program which it believes represents a definite net contribution to the war effort and which at the same time looks hopefully toward successful and useful effort in improving the lot of all of us when this holocaust is over.

METAL is the dominating word in the War Production Program. The term "Metal" to the gas industry means steel and its many alloys, copper and brass, aluminum and magnesium, and other items of less importance. The processing of metal means to the gas industry the application of its fuel to melting, to high temperature heating for forming, to moderate temperature heating for hardening, to lower temperature heating for stress relieving.

Application to War Jobs

These heating processes mean to the gas industry the adjustment of existing equipment and the design of new equipment to conform with the exacting specifications of Army and Navy requirements. Further complications arise because war conditions make necessary adjustment to the using of other alloys than have heretofore been used because of the non-availability or shortage of certain essential alloying elements, such as tungsten or nickel.

Shortage of tungsten, because of inability to maintain imports, forced an increase in the use of molybdenum necessitating major changes in atmospheric requirements of gas-fired furnaces. Tremendous increases in the use of aluminum necessitated the adjustment of the application of gas as a fuel to meet the heat-treating requirements of this metal. The use of magnesium, also, has enormously increased and made it a major item in industrial production. Its heat treatment requires almost revolutionary changes in the concept of requirements as to gas heat-treating equipment. Shortage of copper has brought about a change from brass to steel for shell casings, presenting a new set of heating problems.

The gas industry with its decade of experience in the development of the technique involved in applying its fuel to precision heat-treating demands was not unprepared to cope with the problems of adjusting its fuel to the new situation. Fortunately tremendous strides have been made during the past 10 or 15 years in the development of such equipment as large, continuous automatically controlled furnaces, units designed to heat by radiation only, special atmospheres for use in muffle or radiant tube furnaces for the production of specified surface finishes, high temperature flame impingement equipment for hardening steels, and numerous other equipments for special purposes.

The present all-out war effort materially increases industry's use of fuel for equipment which must produce the parts which go into guns, tanks, airplanes, under very exacting specifications. It is probable that gas is supplying about 50% of the total heat requirements for such purposes. The difficulty of obtaining adequate supplies of fuel oil has markedly increased the demand for gas.

Problems Differ from World War I

It is fortunate that the activity in industrial gas engineering fields, during the past decade or more, had led us to develop in the gas industry a technique in the application of fuel to exacting requirements, and fits us in handling with reasonable expedition the problems arising now. These problems are radically different from those at the time of World War I. At that time not only was fuel engineering an almost unknown profession, but those elaborate equipments which mass automobile production has developed, were not yet conceived. Such gas fuel as was then used was

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Address before A. G. A. Annual Meeting, Chicago, Ill., October 5-6, 1942.

* Vice-President, Michigan Consolidated Gas Co., Detroit, Mich.

applied to relative simple equipments and in those heating operations requirements were much less exacting.

It may be concluded that the quality of the product now is superior in dimension preciseness, in durability, and in other factors important to the pursuit of our present war problem.

The basis on which the American Gas Association sponsors and conducts research in industrial and commercial gas utilization is two-fold. First, it sponsors improvement of specific utilization processes and the development of new processes and, second, it supports the production of fundamental facts and engineering data that are applicable to a number of different heat applications. I am pleased to report that during the Association year 1942 the Committee on Industrial Gas Research, with the encouragement and support of the Executive Board, has aggressively carried on work in both fields.

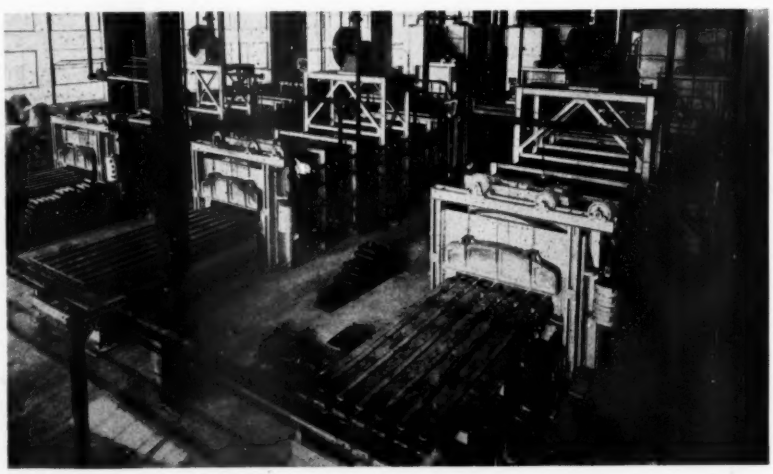
A. G. A. Research Projects

There have been five projects actively worked on during the year. Two or these are projects which pertain to the improvement of gas utilization in specific fields; one is concerned with the development of equipment of a type the gas industry has heretofore not been able to produce; two are for the purpose of developing fundamental technical information that is applicable in many utilization fields. A brief description of these projects may be of interest.

Project No. 43 "Advanced Application of Gas Heat in Bisque Firing" was completed early in the Association year. In this project, a technique was developed whereby direct radiant heat may be applied to the firing of dinnerware and other clay products in the initial firing, known as "bisque firing," which is carried on at 2200° F. and above. Since time immemorial, bisque firing has been accomplished in kilns equipped with muffles designed to prevent contact of the flame and products of combustion with the ware. The basic principles of muffle kiln design were minutely described in books written in the 14th Century. Fundamentally there have been very few changes in design since then. The newly developed method produces highest grade ware, with substantial reduction in rejects, with much shorter cycles and with the entire elimination of muffles. In addition, the B.t.u. used per ton of ware is the lowest yet recorded for fuel kilns, thus placing gas in a new and more favorable position with respect to the lower priced competitive fuels. To date kilns without muffles and using this new type of direct radiant gas heat have been installed in seventeen ceramic plants. Many more plants are ready to make installations as soon as priority limitations permit.

Project No. 46 "Improvements in Non-Ferrous Metal Melting through the Application of Direct Radiant Gas Heat" is now in its second stage. The transfer of heat through crucibles is a challenging limitation to efficient utilization of gas in this field and has been the technical factor which has restricted our ability to obtain crucible melting business in quantity except where gas rates are definitely low. The project is designed to produce a greater heat transfer through the use of direct radiant gas heat and to reduce the size of needed combustion space. It has been demonstrated that higher efficiencies can be secured by these two major improvements as well as by several minor ones. Determination of the exact extent of these higher efficiencies, and the development of equipment for attaining them, constitutes the second part of this project, which is now engaging active attention.

Project No. 38 "Development of Gas Counter Batch-Type Toasters" represents the initiation of a new study by the committee. Large capacity revolving gas toasters have been sold for years but, strange as it may be, no manufacturer has been able to produce a marketable gas toaster of the two or four-slice size for the counter trade. This condition results largely from the fact that toasting is the most critical of all the cooking processes and on a commercial scale is a split second operation. Working with the Committee on Industrial Gas Research, a prominent manufacturer has been able to produce during the last two years a pop-up type automatic gas toaster that, authorities who have examined it state, meets the needs of the trade. It is now at the A. G. A. Laboratories going through grueling tests on the different kinds of gases. Its production must await final patent clearance, and the relaxing of restrictions on the use of critical materials.



Large capacity gas-fired walking beam furnaces for hardening projectiles

Combustion Studies

As is well known, the committee has had conducted at the A. G. A. Laboratories over a period of years a comprehensive series of research projects on the fundamentals of high temperature combustion of industrial gas. Taken as a whole, this constitutes one of the most extensive investigations for the production of original material that has ever been undertaken in this field. The seventh individual project in this series of high temperature combustion researches has just been completed. This project, known as

"Determination of Effect of Reducing Atmospheres on the Combustion of Industrial Gas" has been reported on in two technical research bulletins—No. 11 and No. 15.

No. 15 is just off the press and will be distributed immediately throughout our industry and in the technical and scientific field, so that its valuable material can be studied by engineers and others, with a view to its application as soon as possible. It presents data on the combustion of natural, manufactured and liquid gases with and without the application of heat external to the combustion chamber and on the effect of catalysts in promoting combustion at lower aerations than is otherwise practicable. General properties of the principal constituents of furnace atmospheres, the preparation of these atmospheres by gaseous combustion and their action on metals are discussed. Fundamental laws of chemical equilibrium as applied to furnace atmospheres are presented and typical calculations included to illustrate their use. Analytical data on minute quantities of intermediate products of combustion such as aldehydes, organic acids and ammonia are included.

I would like to urge that this new bulletin be given careful study by all those in every organization whose interest lies particularly in this field. The executives of our companies could assist greatly in making this bulletin an effective instrument by directing attention to the need for its study.

Gas Immersion Heater Design

Another research project which the committee has assigned to the A. G. A. Laboratories concerns "Gas Immersion Heater Design and Operation." The art of burning gas in tubes and utilizing the heat given off by the walls of the tubes has had a phenomenal growth. Gas tubes are used for heating over the entire temperature range from that required for ordinary liquids to that required for high temperature furnace work. The latter tubes are known as "Gas Radiant Tubes" and the former as "Gas Immersion Tubes." Our present project is concerned with Gas Immersion Tubes. In the development of the art, the point of practical limitations has been reached, and further progress must depend upon many interrelated factors that can only be solved by a scientific approach, analysis, and their correlation. This project is now well under way and the first data will be published early next year.

The immersion tube method is destined to become an increasingly important tool in industrial and commercial heating, but much depends upon our ability to develop what is now a *good* tool into a *better* tool. I might cite one concrete example: Deep fat fryers are heated with gas immersion tubes and we enjoy a large and profitable business from them. But the Research Committee is convinced that in order to fortify and extend this business in the face of very severe competition, ways must be found to make immersion tubes deliver *more heat,* and at *faster rates* than has yet been found possible. The committee believes that this is possible and that this research is leading the way.

For the new Association year, the committee has been authorized by the Executive Board to work toward the completion of the projects I have described. At least one more important project will probably be inaugurated. Studies are now under way to determine the best method of approach. This proposed project is in the general field of "furnaceless" heating of metals.

Most metal heating has been done in furnaces. These have been highly developed to the point where they can well be described as "heating machines," because of the mechanical and control features which have been incorporated into them. However, there has recently grown up in the metallurgical field a definite trend toward a new art, whereby metal of all shapes and sizes is heated directly without the benefit of any furnace. With electricity, this is accomplished in several ways, such as, by induction heating, or by using the resistance of the metal itself to produce internal heat, as exemplified in wire heating. With gas, flame hardening has great possibilities for such parts as gears and sprockets, and open flame heating of wire is far advanced.

No one knows how far "furnaceless" industrial heating with gas can be carried, and no one knows how far "furnaceless" heating with electricity will go. But one thing is certain—the trend is definitely in that direction and it behooves the gas industry to keep

Gas—Backing Up the Fighting Front

One of the most prominent show windows in the Michigan Consolidated Gas Company's main office building in Detroit has been in continued use for displaying industrial gas applications for a longer period than any other gas utility window on record. The window is changed every month and is currently showing the important part industrial gas is playing in war production factories

ahead, or fully in stride with, suitable developments. As this procedure advances, not only will speed of heating be radically increased, but many well accepted metallurgical standards may be expected to fall from favor, because scaling and decarburization resulting from a greatly reduced heating cycle may be quite different from that encountered with present heating periods.

The committee hopes to complete its preliminary studies and inaugurate this new project before early Spring.

The supreme challenge of all time came to industrial gas and industrial gas equipment when the preparedness program started and was quickly followed by the all-out war production program. It was too late to design new furnaces and develop new methods of heating them. Immense new factories and innumerable expansions of old factories meant that equipments had to be built the way our manufacturers knew how to build them. They had, moreover, to be built, shipped and installed in great numbers.

Industrial Engineers' Contribution

Fortunately for us, and most fortunately for the war effort, designs *had* been developed, *had* been tested, and *had* been proved before the rush came. Sound research had been conducted and it does not seem boastful to say that in this the Association played no mean part. Advanced engineering, based on this sound research and development, had placed our industrial equipment manufacturers and our industrial gas engineers in a position where they were sure of their products. Proper installation of this fine equipment, together with proper operating practices, are contributing factors of the important part of industrial gas is playing in the war production program. Our industrial gas engineers, working in close harmony with equipment manufacturers' engineers and with the production personnel of American and Canadian factories, have contributed a great deal toward bringing this condition about.

There were sound reasons why gas entered this all-out production period as the preferred fuel of industry. It will undoubtedly remain so during the war. Association research, together with equipment manufacturer research and development, will continue to keep it so for the duration and beyond.

F. J. Rutledge, former chairman of the Committee on Industrial Gas Research, who directed the work of this committee so successfully over a long period of years, pointed out at the 1941 Executive Conference—"It is a known fact that every dollar directly spent on this Association research program has caused many additional dollars to be spent by manufacturers, by customer groups, and by others in further development and application."

Our task is to encourage continued industrial gas research; to continue to furnish leadership so that there will be no wasted research motion anywhere in the industry; and to sponsor and conduct specific research and development projects which will help the entire industry advance its contribution in war production. And when peace returns, and the nation's factories are reconverted, we must make sure that industrial gas will be ready for the tasks which will then confront it.

Floyd L. Carlisle is Dead

F. L. Carlisle

FLOYD L. CARLISLE, chairman of the board of Consolidated Edison Co. of New York, Inc., and of Niagara Hudson Power Corp., one of the most able public utility executives of the nation, died Nov. 9. He was 61 years old.

A young upstate lawyer who became interested in power development and banking, Mr. Carlisle rose to leadership of the largest public utility group in the world. He was the guiding figure in the formation of the Niagara Hudson Power Corporation in 1929 and in the series of mergers of subsidiary companies into Consolidated Edison, which resulted in a greatly simplified corporate structure.

Born in Watertown, N. Y., on Mar. 5, 1881, he was graduated from Cornell University in 1903. After practicing law with the firm of Carlisle & Carlisle and following banking and other activities, Mr. Carlisle entered the public utility field in 1920, heading a syndicate which bought the Northern New York Utilities, Inc., the largest public utility operating company in the northern New York region and became the chairman of the board of directors. In 1921 he came to New York to establish the firm of F. L. Carlisle & Co., Inc., which conducted an investment banking business up to 1934.

In 1926, under Mr. Carlisle's direction, the Northeastern Power Corporation was organized.

His first connection with the Consolidated Edison group came with his election as a director of the New York Edison Company in May, 1930. In February 1931 he was made chairman of the board of directors of New York Edison. In May 1930 he was elected a trustee and in February 1932 chairman of the board of Consolidated Gas Company of New York, which later became the present Consolidated Edison Company of New York.

During the years 1930-1934 he served at various times as a director of The United Corporation, Columbia Gas and Electric Corporation and United Gas Improvement Company, and at the time of his death served as a director of affiliated companies of Niagara Hudson and Consolidated Edison.

Consolidated Edison Elects Tapscott and Fogg

Ralph H. Tapscott

TRUSTEES of Consolidated Edison Company of New York, Inc., Nov. 24 named Ralph H. Tapscott, the company's president, as its chief executive officer, thereby succeeding to the responsibilities held by the late Floyd L. Carlisle. Oscar H. Fogg, vice-chairman of the board, was elected to the newly created post of chairman of the executive committee. The offices of chairman and vice-chairman of the board were abolished. The board indicated that in all other respects Mr. Tapscott and Mr. Fogg would perform their respective duties as heretofore.

Similar action was taken by the boards of directors of the other System Companies, of which the late Mr. Carlisle served as chairman, namely, Brooklyn Edison Company, Inc., and New York and Queens Electric Light and Power Company.

Westchester Lighting Company and The Yonkers Electric Light and Power Company directors also abolished the offices of chairman and vice-chairman of the board, electing Mr. Fogg, formerly vice-chairman, to the newly created office of chairman of the executive committee of each of those companies.

Gas Cooking . . . *a 10 to 1 Favorite Over Electricity in Urban and Suburban Homes*

By THOMAS J. SHANLEY

Statistician, American Gas Association

GAS cooking is a 10 to 1 favorite over electricity in America's 27,747,973 urban and suburban homes according to a study of the first housing survey made by the Bureau of Census. This further evidence of the overwhelming popularity of gas for cooking is revealed in the following analysis of the use of gas, electricity and other fuels for cooking which was compiled entirely from 1940 data recently released by the United States Department of Commerce, Bureau of Census.

Urban Homes

Generally speaking, urban homes are those in communities having 2,500 or more population although several large unincorporated areas are excluded and are classified as rural non-farm homes.

Approximately 15,000,000 homes representing 73% of the total of 20,289,772 reporting urban homes employ gas as the cooking fuel. In nine states formidable saturations of 80% or more of all the occupied dwellings reported use this clean economical fuel for cooking. In California 1,436,501 dwelling units out of 1,548,380 reported in urban areas, utilize gas as the cooking fuel, a saturation of 93% of all the homes covered in that state. Substantial above-average saturations were also reported for the states of New York, Ohio, Oklahoma, New Jersey, West Virginia, Illinois, Maryland and in the District of Columbia. It is interesting to note that seven-eights of all homes utilizing gas as a cooking fuel are located in urban areas of the United States.

That gas is the predominant fuel in America's kitchens is further borne out by the fact that, of the entire 48 states and the District of Columbia, only five show electric cooking saturation ahead of gas in urban areas. Gas is not readily available in these states, while hydro-electric generation is prevalent, because of the characteristics of this territory.

Wood, coal or coke, kerosene or gasoline, and not electricity represent the major potential markets for gas. Four million two hundred forty-seven thousand eight hundred fifty-three or 21% of all the occupied dwelling units reported, utilize one of these fuels in urban territories for cooking, while electricity trails far behind any one of them, having only 1,038,285 ranges or 5% of all the homes covered. This low saturation exists despite the fact that 95% of these homes have electric lighting.

Rural Non-Farm Homes

Rural non-farm homes are, generally speaking, those located in communities with populations of less than 2,500,

GAS VS. ELECTRICITY AS A COOKING FUEL, BY STATES, FOR THE UNITED STATES, 1940

	URBAN				*RURAL NON-FARM*			
	All Units (Occupied and Unoccup.)	*Cooking* % of Homes*		*Elec. Ltg.* % of Homes*	*All Units (Occupied and Unoccup.)*	*Cooking* % of Homes*		*Elec. Ltg.* % of Homes*
		Gas	*Elec.*			*Gas*	*Elec.*	
California	1,679,699	92.8	3.6	99.3	468,060	60.9	8.2	90.1
New York	3,279,539	89.5	2.2	99.3	547,515	41.1	8.3	89.6
Ohio	1,331,713	89.2	3.4	98.2	365,025	35.2	12.6	86.8
Oklahoma	269,613	86.3	0.5	88.9	145,864	44.5	0.7	57.5
New Jersey	961,347	86.0	1.0	98.1	226,514	52.6	7.6	92.5
Dist. of Columbia	185,128	85.8	3.5	95.9				
West Virginia	144,152	84.4	3.9	95.2	199,660	35.1	2.0	76.1
Illinois	1,687,563	84.2	2.3	98.5	333,505	19.4	10.1	86.2
Maryland	297,243	81.1	1.9	96.8	143,734	35.1	10.3	81.2
Kansas	235,019	79.4	3.3	96.0	135,935	40.3	5.9	85.4
Delaware	38,181	78.7	2.0	94.8	25,029	42.5	6.9	82.2
Michigan	958,532	77.6	10.0	99.1	322,921	21.5	25.8	88.9
Pennsylvania	1,764,597	77.0	3.2	98.6	633,218	33.2	6.5	87.0
Wisconsin	477,086	73.8	8.0	99.0	205,549	17.4	14.9	84.8
Connecticut	314,076	73.4	4.1	99.0	147,705	38.4	14.6	94.1
Nebraska	153,358	72.7	4.7	97.9	94,515	18.7	6.6	87.7
Texas	845,982	71.3	1.5	84.7	383,239	39.4	3.4	63.0
Minnesota	394,693	71.1	10.9	98.8	159,769	11.3	15.2	81.7
Missouri	609,286	70.8	4.1	96.5	219,366	18.2	7.4	75.8
Indiana	555,147	67.3	5.9	97.6	228,338	18.0	9.8	84.8
Kentucky	247,957	66.6	1.9	90.6	187,475	14.9	2.5	60.3
Wyoming	29,024	66.0	4.8	97.0	25,365	30.1	3.9	76.0
Iowa	320,989	65.2	5.2	97.3	168,924	15.8	7.8	89.6
Rhode Island	181,143	64.6	3.1	98.7	19,407	13.1	11.0	91.8
Massachusetts	1,059,441	63.4	3.7	98.8	135,579	17.7	9.3	91.3
Louisiana	271,064	63.1	0.4	78.5	143,392	23.8	1.3	48.6
Colorado	182,794	57.6	5.5	97.0	96,208	7.4	5.1	74.2
Arizona	52,878	57.5	3.6	93.3	62,038	21.0	9.1	71.9
Montana	67,221	54.2	15.6	98.1	56,301	7.5	8.2	79.0
Arkansas	127,751	53.6	2.2	76.8	116,225	12.6	1.4	43.6
South Dakota	45,281	52.5	12.3	97.3	53,087	7.9	10.2	80.6
North Dakota	35,118	50.9	15.5	98.3	49,063	3.9	11.3	82.8
New Mexico	49,527	49.1	3.3	81.8	50,166	14.9	1.3	46.0
Virginia	252,179	47.5	7.5	90.3	184,768	6.8	10.0	64.6
Mississippi	123,104	35.6	3.4	68.1	99,130	6.9	4.1	45.3
Vermont	33,746	32.5	14.7	98.7	44,036	2.3	7.8	83.7
Florida	337,494	31.2	13.8	83.2	174,213	5.8	8.9	54.0
Georgia	296,325	30.8	8.2	73.4	179,371	5.1	10.7	56.6
Alabama	232,437	29.4	7.9	76.8	164,531	2.2	6.9	53.8
New Hampshire	79,549	29.2	9.5	96.4	59,260	2.8	8.0	81.8
Oregon	184,069	29.1	32.6	98.7	104,744	6.9	14.4	83.3
Tennessee	283,649	25.7	12.5	84.4	158,037	2.6	12.2	58.5
Utah	85,262	25.2	26.4	99.3	39,763	2.8	10.2	93.1
Maine	94,787	24.8	7.6	96.6	120,424	1.6	5.0	78.5
Washington	322,164	18.8	31.8	98.6	165,746	2.1	15.5	88.4
Nevada	13,907	18.5	33.5	97.1	18,086	9.7	13.4	76.5
South Carolina	126,503	17.8	9.3	74.9	132,422	1.1	7.1	63.1
North Carolina	246,060	15.2	12.1	85.4	227,681	1.2	7.5	68.0
Idaho	52,975	2.5	40.1	97.3	45,934	0.4	14.2	81.3
Total U. S.	21,616,352				8,066,837			
U. S. Total Occupied Dwellings	20,596,500	73.0	5.1	95.8	7,151,473	24.0	8.7	77.8

*Although these percentages are based only on the number of reporting (occupied) homes, we assume that unoccupied homes will follow in the same proportion as occupied homes.

Source: 16th Census of the United States—1940

OCCUPIED DWELLING UNITS BY PRINCIPAL TYPE OF COOKING FUEL FOR THE UNITED STATES BY STATES, URBAN AND RURAL: 1940*

States	TOTAL								URBAN							
	Total Occupied Dwellings Reporting a Cooking Fuel	Coal or Coke	Wood	Gas	Electricity	Kerosene or Gasoline	Other	None	Total Occupied Dwellings Reporting a Cooking Fuel	Coal or Coke	Wood	Gas	Electricity	Kerosene or Gasoline	Other	None
Alabama	662,406	85,024	441,778	69,328	30,282	33,346	300	2,348	223,945	49,506	69,681	65,816	17,710	19,450	206	1,576
Arizona	129,068	3,284	56,352	40,404	9,016	17,434	880	1,698	48,303	1,212	13,018	27,798	1,744	3,800	170	561
Arkansas	488,245	3,683	368,434	81,460	4,776	28,130	201	1,561	121,671	1,486	40,663	65,272	2,693	10,508	111	938
California	2,108,397	3,992	187,024	1,710,532	118,192	64,381	7,840	16,436	1,548,380	2,242	31,836	1,436,501	55,492	11,876	1,167	9,266
Colorado	310,527	152,376	23,297	105,393	14,171	12,803	1,141	1,346	171,727	58,672	918	98,834	9,373	3,042	152	736
Connecticut	440,850	35,563	28,308	266,683	32,050	66,339	10,605	1,302	298,999	22,782	5,064	219,375	12,111	30,998	7,638	1,031
Delaware	69,601	4,421	13,239	38,549	2,592	10,455	157	188	36,562	2,731	1,294	28,789	744	2,814	38	152
Dist. of Columbia	170,722	9,453	3,060	146,490	5,964	3,373	236	2,146	170,722	9,453	3,060	146,490	5,964	3,373	236	2,146
Florida	510,901	611	159,623	99,989	55,866	188,989	884	4,939	289,021	407	45,441	90,069	39,947	109,542	606	3,009
Georgia	740,516	24,775	506,371	96,435	44,159	65,122	352	3,302	284,951	19,165	113,138	87,698	23,247	39,416	227	2,060
Idaho	139,039	46,702	59,027	1,464	29,895	925	389	637	49,676	18,457	9,125	1,256	19,922	376	222	318
Illinois	2,164,280	385,398	100,907	1,426,180	76,823	159,405	7,400	8,167	1,612,745	132,973	3,835	1,357,601	37,517	71,752	1,912	7,155
Indiana	948,548	199,080	107,692	405,642	60,562	168,733	4,228	2,611	533,861	62,224	4,044	359,067	31,433	74,129	1,064	1,900
Iowa	691,889	145,883	147,257	234,182	32,473	103,625	26,210	2,259	307,595	32,596	5,645	200,528	17,368	48,380	1,713	1,365
Kansas	504,157	36,395	98,522	240,332	17,926	108,373	1,284	1,325	221,372	10,483	6,896	175,815	7,411	19,869	206	692
Kentucky	689,555	232,030	215,883	188,190	10,434	40,827	638	1,553	235,996	57,501	2,566	157,217	4,525	12,792	321	1,074
Louisiana	585,492	2,104	293,319	200,685	3,428	82,019	781	3,156	260,712	1,801	48,603	164,503	1,045	41,788	613	2,359
Maine	215,703	13,662	121,843	23,009	11,461	34,938	10,295	495	86,932	8,577	24,157	21,531	6,622	16,593	9,100	352
Maryland	456,190	39,601	74,170	272,709	19,934	47,076	1,038	1,662	280,274	24,763	5,486	227,402	5,357	15,610	290	1,366
Massachusetts	1,100,026	96,526	47,960	641,607	46,459	228,929	33,608	4,937	983,733	85,115	22,098	623,889	36,297	180,643	30,885	4,806
Michigan	1,379,198	108,773	182,804	769,855	181,101	131,173	2,182	3,310	914,392	41,954	26,925	709,129	91,246	41,537	909	2,692
Minnesota	718,726	41,015	252,747	287,848	64,480	56,800	12,663	3,173	378,413	13,656	28,147	269,169	41,436	22,548	1,283	2,174
Mississippi	525,135	6,349	437,238	50,097	8,769	20,112	164	2,406	118,574	3,534	57,756	42,187	3,973	9,985	71	1,068
Missouri	1,054,462	102,733	308,535	439,969	41,155	155,293	2,057	4,720	566,115	52,912	19,951	400,546	22,982	64,974	920	3,830
Montana	157,276	52,441	42,785	43,540	14,267	2,549	393	1,301	63,120	12,519	5,794	34,183	9,848	284	45	447
Nebraska	356,661	57,026	104,209	123,419	13,626	49,417	7,482	1,482	144,548	11,984	3,805	105,053	6,789	15,720	493	704
Nevada	32,329	9,557	10,718	3,995	6,574	828	177	480	12,947	3,353	2,569	2,391	4,337	174	27	96
New Hampshire	131,152	7,527	50,749	22,953	10,718	36,175	2,596	434	74,325	5,149	16,462	21,713	7,033	21,345	2,277	346
New Jersey	1,080,854	92,150	28,449	851,496	24,935	77,282	3,314	3,228	883,200	71,076	6,182	759,718	9,220	31,813	2,313	2,878
New Mexico	126,884	21,049	61,792	30,298	2,497	10,409	199	640	45,608	8,758	10,093	22,386	1,485	2,399	59	428
New York	3,590,809	235,402	200,743	2,862,089	107,416	167,067	6,038	12,054	2,993,322	150,749	20,281	2,677,544	65,086	64,721	3,848	11,093
North Carolina	776,922	35,940	517,143	38,664	47,332	134,455	569	2,819	236,264	22,288	85,277	35,818	28,612	62,270	351	1,648
North Dakota	149,688	77,171	20,784	19,237	10,584	20,664	519	729	33,524	4,377	1,054	17,053	5,202	5,409	45	384
Ohio	1,876,756	268,370	78,237	1,281,737	104,981	135,147	4,129	4,155	1,277,302	60,451	2,453	1,138,797	43,316	27,873	989	3,423
Oklahoma	600,148	11,410	193,836	295,600	2,542	93,566	941	2,253	249,960	2,924	16,545	215,781	1,204	11,769	85	1,652
Oregon	331,464	3,372	194,306	56,543	72,459	2,094	872	1,818	169,559	1,223	61,691	49,421	55,317	679	293	935
Pennsylvania	2,484,567	642,931	118,865	1,520,894	102,462	92,097	2,081	5,237	1,687,970	290,907	7,925	1,300,231	54,754	28,731	901	4,521
Rhode Island	186,221	15,185	6,127	111,715	7,037	41,227	4,110	820	169,891	13,645	2,690	109,793	5,330	33,594	4,047	792
South Carolina	429,092	7,401	301,811	23,215	21,810	73,163	188	1,504	122,026	4,613	50,414	21,762	11,378	32,778	107	974
South Dakota	162,704	47,569	42,005	27,002	10,488	29,938	4,820	882	42,846	3,744	3,243	22,483	5,288	7,679	88	321
Tennessee	705,926	147,161	379,874	74,654	56,892	43,089	425	3,831	272,290	93,710	46,607	70,110	33,927	24,738	280	2,918
Texas	1,656,230	4,801	531,475	733,094	29,028	342,912	2,367	12,553	792,534	1,206	102,412	564,698	12,068	102,840	812	8,498
Utah	138,235	79,086	10,596	21,601	26,288	197	38	429	81,129	37,967	875	20,405	21,417	94	26	345
Vermont	91,463	6,225	47,922	11,360	7,791	17,191	780	194	32,144	2,757	5,722	10,458	4,712	7,794	561	140
Virginia	619,533	114,666	283,141	127,106	37,816	54,070	385	2,349	241,001	56,688	24,868	114,541	17,981	25,310	181	1,432
Washington	528,083	31,281	300,939	59,328	120,018	4,543	7,046	4,928	296,881	18,456	118,667	55,819	94,383	1,954	3,494	4,108
West Virginia	439,726	149,430	68,774	204,795	9,912	6,089	123	603	138,617	13,513	541	116,957	5,452	1,681	45	428
Wisconsin	818,639	36,289	262,138	370,687	65,684	78,472	3,442	1,927	458,762	13,736	35,498	338,345	36,695	32,072	1,013	1,403
Wyoming	68,202	28,613	8,808	25,010	2,334	2,693	164	580	27,071	7,304	108	17,861	1,303	383	29	83
Total Number Reporting—U. S.	34,343,197	3,961,486	8,101,616	16,777,064	1,837,459	3,343,934	178,731	142,907	20,291,512	1,627,299	1,221,123	14,819,803	1,038,296	1,399,899	82,469	102,623
Percent of Total	100.0	11.5	23.6	48.8	5.4	9.7	0.5	0.4	100.0	8.0	6.0	73.0	5.1	6.9	0.4	0.5

*These data do not include those dwellings not reporting.

Source: 16th Census of the United States—1940

OCCUPIED DWELLING UNITS BY PRINCIPAL TYPE OF COOKING FUEL FOR THE UNITED STATES BY STATES, URBAN AND RURAL: 1940*

States	RURAL—NON-FARM								RURAL—FARM							
	Total Occupied Dwellings Reporting a Cooking Fuel	Coal or Coke	Wood	Gas	Electricity	Kerosene or Gasoline	Other	None	Total Occupied Dwellings Reporting a Cooking Fuel	Coal or Coke	Wood	Gas	Electricity	Kerosene or Gasoline	Other	None
Alabama	154,535	31,794	95,795	3,358	10,613	12,259	53	663	283,926	3,724	276,302	154	1,959	1,637	41	109
Arizona	54,865	1,930	24,642	11,502	4,981	10,244	587	979	25,900	142	18,692	1,104	2,291	3,390	123	158
Arkansas	109,871	1,227	80,506	13,830	1,589	12,159	46	514	256,703	970	247,265	2,358	494	5,463	44	109
California	387,531	1,298	82,384	235,962	31,740	28,751	3,101	4,315	172,466	452	72,804	38,069	30,960	23,754	3,572	2,855
Colorado	76,729	51,734	8,507	5,687	3,945	6,091	286	479	62,071	41,970	13,872	872	853	3,670	703	131
Connecticut	118,147	10,804	11,031	45,400	17,303	30,734	2,643	232	23,704	1,977	12,213	1,908	2,636	4,607	324	39
Delaware	21,550	1,319	3,782	9,155	1,489	5,692	85	28	11,489	371	8,163	605	359	1,949	34	8
Dist. of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Florida	149,859	174	63,033	8,728	13,313	62,828	216	1,567	72,021	30	51,149	1,192	2,606	16,619	62	363
Georgia	167,919	4,477	113,398	8,529	17,885	22,534	73	1,023	287,646	1,133	279,835	208	3,027	3,172	52	219
Idaho	40,452	12,325	21,582	147	5,739	343	92	224	48,911	15,920	28,320	61	4,234	206	75	95
Illinois	305,978	128,067	16,160	59,298	30,889	68,336	2,318	910	245,557	124,358	80,912	9,281	8,417	19,317	3,170	102
Indiana	205,113	63,683	19,192	36,874	20,058	63,035	1,634	637	209,574	73,173	84,456	9,701	9,071	31,569	1,530	74
Iowa	158,984	52,915	21,454	25,114	12,401	41,961	4,370	769	225,310	60,372	120,158	8,540	2,704	13,284	20,127	125
Kansas	126,367	12,237	15,492	50,904	7,446	39,325	409	554	156,418	13,675	76,134	13,613	3,069	49,179	669	79
Kentucky	177,262	92,546	32,373	26,487	4,496	20,837	204	319	276,297	81,983	180,944	4,486	1,413	7,198	113	160
Louisiana	134,740	176	72,749	32,070	1,790	27,253	119	583	190,040	127	171,967	4,112	593	12,978	49	214
Maine	88,959	4,609	60,445	1,398	4,456	16,845	1,067	139	39,812	476	37,241	80	383	1,500	128	4
Maryland	121,864	10,787	28,880	42,780	12,508	26,060	630	219	54,052	4,051	39,804	2,527	2,069	5,406	118	77
Massachusetts	93,023	9,186	14,279	16,458	8,629	41,935	2,424	112	23,270	2,225	11,583	1,260	1,533	6,351	299	19
Michigan	249,150	26,500	44,423	53,503	64,284	59,028	871	541	215,656	40,319	111,456	7,223	25,571	30,608	402	77
Minnesota	133,748	13,541	55,022	15,061	20,287	26,255	2,697	885	206,565	13,818	169,578	3,618	2,757	7,997	8,683	114
Mississippi	94,034	2,079	72,090	6,527	3,899	8,239	36	1,164	312,527	736	307,392	1,383	897	1,888	57	174
Missouri	201,901	25,578	61,232	36,725	14,903	61,940	747	776	286,446	24,243	227,352	2,698	3,270	28,379	390	114
Montana	48,838	17,987	16,056	8,540	4,013	1,557	156	529	45,318	21,935	20,935	817	406	708	192	325
Nebraska	88,275	23,110	17,967	16,468	5,846	23,340	941	603	123,838	21,932	82,437	1,898	991	10,357	6,048	175
Nevada	15,369	5,515	5,252	1,487	2,052	610	113	340	4,013	689	2,897	117	185	44	37	44
New Hampshire	41,020	1,981	21,291	1,129	3,278	12,995	264	82	15,807	397	12,996	111	407	1,835	55	6
New Jersey	165,288	16,514	11,009	87,004	12,600	37,087	806	268	32,366	4,560	11,258	4,774	3,115	8,382	195	82
New Mexico	42,248	7,721	24,245	6,300	555	3,192	65	170	39,028	4,570	27,454	1,612	457	4,818	75	42
New York	416,637	62,234	63,341	171,097	34,521	82,855	1,791	798	180,850	22,419	117,121	13,448	7,809	19,491	399	163
North Carolina	214,084	10,860	121,093	2,649	16,143	62,409	143	787	326,574	2,792	310,773	197	2,577	9,776	75	384
North Dakota	46,281	22,910	4,556	1,799	5,229	11,360	104	323	69,883	49,884	15,174	385	153	3,895	370	22
Ohio	334,646	88,817	11,291	117,756	42,304	71,649	2,204	625	264,808	119,102	64,493	25,184	19,361	35,625	936	107
Oklahoma	137,303	3,925	43,533	61,071	974	27,009	279	512	212,885	4,561	133,758	18,748	364	54,788	577	89
Oregon	90,803	1,311	68,086	6,283	13,064	1,034	404	621	71,102	838	64,529	839	4,078	381	175	262
Pennsylvania	589,919	265,931	37,583	196,053	38,519	50,235	948	650	206,678	86,093	73,357	24,610	9,189	13,131	232	66
Rhode Island	13,746	1,282	2,149	1,800	1,511	6,922	61	21	2,584	258	1,288	122	196	711	2	7
South Carolina	124,474	2,213	75,333	1,362	8,879	36,246	54	387	182,592	575	176,064	91	1,553	4,139	27	143
South Dakota	48,608	15,041	8,774	3,827	4,935	14,994	526	511	71,250	28,784	29,988	692	265	7,265	4,206	50
Tennessee	150,451	38,419	75,028	3,905	18,352	14,043	84	620	283,185	15,032	258,239	639	4,613	4,308	61	293
Texas	354,728	1,262	105,885	139,631	12,038	92,119	695	3,098	508,968	2,333	323,178	28,765	4,922	147,953	860	957
Utah	36,733	26,967	4,815	1,045	3,743	76	9	78	20,373	14,152	4,906	151	1,128	27	3	6
Vermont	34,785	3,025	19,794	789	2,702	8,237	186	52	24,534	443	22,406	113	377	1,160	33	2
Virginia	171,984	41,470	77,006	11,746	17,196	23,744	150	672	206,548	16,508	181,267	819	2,639	5,016	54	245
Washington	139,185	9,050	99,956	2,896	21,625	1,981	3,026	651	92,017	3,775	82,316	613	4,010	608	526	169
West Virginia	190,903	101,717	14,710	66,983	3,801	3,476	54	162	110,206	34,200	53,523	20,855	659	932	24	13
Wisconsin	159,155	9,647	63,283	27,679	23,753	32,920	1,416	457	200,722	12,906	163,357	4,663	5,236	13,480	1,013	67
Wyoming	22,477	10,409	2,660	6,774	868	1,471	92	203	18,654	10,900	6,040	375	163	839	43	294
Total Number Reporting	7,050,541	1,348,304	2,013,147	1,691,570	613,144	1,314,245	39,279	30,852	7,001,144	985,883	4,867,346	265,691	186,019	629,790	56,983	9,432
Percent of Total	100.0	19.1	28.6	24.0	8.7	18.6	0.6	0.4	100.0	14.1	69.5	3.8	2.7	9.0	0.8	0.1

*These data do not include those dwellings not reporting.

Source: 16th Census of the United States—1940

none of which represent farm premises.

While it was not expected that, in rural non-farm areas, because of the limited availability of gas, gas would show up as the predominant fuel, the picture here is also quite favorable. Once again wood, coal or coke, kerosene or gasoline represent the major potential markets for the gas industry. Gas for cooking is the second largest single factor in this field, with a national saturation of 24% of all the homes reported. The electric industry ranks fourth, with a saturation of 9%, and a million fewer homes cooking with electricity than with gas. This despite the fact that 78% of the rural non-farm homes use electricity for lighting.

California once again leads the country in number of rural non-farm homes with gas ranges, reporting a saturation of 61% or 235,962 dwelling units out of a state total of 387,551 homes reporting cooking of all kinds. Once again the same trend was indicated by the states of New York, Ohio, Oklahoma and New Jersey. All these states showed a saturation of better than 35%. It must be remembered that a considerable number of these homes are utilizing bottled gas—another graphic illustration of just how bottled gas is the up and coming ally of the gas industry in areas where utility gas is not available.

Reappointed Chairman of Personnel Committee

J. D. Dingwell, Jr.

JAMES D. DINGWELL, JR., assistant vice-president in charge of personnel relations of the Washington Gas Light Co., Washington, D. C., has been reappointed chairman of the Committee on Personnel Practices of the American Gas Association by Arthur F. Bridge, president of the Association.

In making the reappointment, President Bridge commended Mr. Dingwell for the outstanding contributions of the committee under his leadership and stated that it was imperative that the Association's personnel work be continued under able and experienced leadership during this critical war period.

The A. G. A. Rate Committee at its meeting November 20 in New York to discuss war conditions. Left to right, seated—G. I. Vincent, Central New York Power Corp.; C. L. Follmer (chairman), Consolidated Gas Electric Light & Power Co. of Baltimore; I. L. Craig, Philadelphia Electric Co.; and A. I. Phillips, consulting engineer. Standing—Harry Weitzman, Rochester Gas & Electric Corp.; S. S. Mason, Washington Gas Light Co.; Robb Quinby, Brooklyn Union Gas Co.; C. F. deMey, Columbia Engineering Corp.; A. Gordon King, A. G. A.; Frederick C. Beck, United Gas Pipe Line Co.; R. E. Keller, Ebasco Services; Benjamin Miller, Gas Advisers, Inc.; and Kurwin R. Boyes, A. G. A.

Among the valuable achievements of the Committee on Personnel Practices during the past year was the preparation of a complete outline of suggested procedure for the guidance of companies seeking essential deferments. Entitled "The A, B, C of Occupational Deferment Procedure," this information had the wholehearted endorsement of General Lewis B. Hershey, director of the Selective Service System. At present, the committee is developing a list of critical occupations in the gas industry for use in solving the manpower problem.

Mr. Dingwell has been associated with the Washington Gas Light Company since 1933. Prior to that time, he was employed by the Blackstone Valley Gas and Electric Co. and the Pawtucket Gas Company.

A. R. Bailey Is U. S. Army Major

Major Bailey

A. R. BAILEY, assistant to the president, Coast Counties Gas & Electric Co., San Francisco, Calif., has been appointed a Major in the U. S. Army. Major Bailey reported for active duty on November 9 at Fort Mason, San Francisco, where he is personnel officer for the various ports of embarkation and staging camps in California and Oregon. He may be addressed as follows:

Major Alan R. Bailey, T.C.
S.F.P.E.
Fort Mason
San Francisco, Calif.

Major Bailey has been associated with Coast Counties for many years and is widely acquainted among utility companies and manufacturers.

In addition to his numerous executive duties, Major Bailey has taken an active part in Association work. For several years he has been a member of the Subcommittee on Approval Requirements for Central Heating Gas Appliances. In June, 1941, he was appointed its chairman.

The Approval Requirements Committee at its recent meeting unanimously adopted a resolution providing for the resumption by Major Bailey of the chairmanship of his committee following the war.

Heads Rate Committee for Third Year

C. L. Follmer

FOR the third consecutive year C. L. Follmer, manager of the Rate Research Department of the Consolidated Gas Electric Light and Power Company of Baltimore, Baltimore, Md., has been appointed chairman of the Rate Committee of the American Gas Association.

Made up of rate experts the Rate Committee meets regularly and considers current developments on rates and related matters. For the past year these problems have been almost wholly concerned with wartime operations. In order to assure continuity of the committee's deliberations President A. F. Bridge has reappointed the entire 1942 personnel.

From 1924 to date Mr. Follmer has been associated with the Consolidated Gas Electric Light and Power Company of Baltimore and since 1938 as manager of the Rate Research Department.

Personal AND OTHERWISE

N. H. Gellert Heads Utility Group

N. Henry Gellert

N. HENRY GELLERT has been elected chairman of the board and president of the American States Utilities Corporation, succeeding J. B. Whitworth of Chesterton, Md. Other officers elected are Dr. Willson B. Moody of Omaha, Neb., vice-president; George W. Dill, also of Omaha, secretary; and W. C. Welmon of Los Angeles, treasurer.

The corporation will close its office in Chestertown and open an office in Philadelphia, while the secretary's office will be located in Omaha. Headquarters of Mr. Gellert will remain in Philadelphia where his offices as management consultant are now located.

Mr. Gellert retains his management business through which he directs the operation of the Great Lakes Utilities Co., Atlantic Gas Corp., Pennsylvania & Southern Gas Co., and supervises the management of the Seattle Gas Co., Seattle, Wash. He is a former director of the American Gas Association, trustee of the Institute of Gas Technology, and member of several national engineering societies.

Advertising Appointments

HCARL WOLF, chairman of the Committee on National Advertising of the American Gas Association, has announced the following appointments to his committee:

D. P. Hartson, vice-president and general manager, Equitable Gas Company, Pittsburgh, representing participating companies in Western Pennsylvania, Ohio and West Virginia.

Dean H. Mitchell, president, Northern Indiana Public Service Co., Hammond, representing participating companies in Illinois, Iowa, Michigan, Wisconsin, North Dakota, South Dakota, Indiana and Minnesota.

H. P. J. Steinmetz, vice-president in charge of sales, Public Service Electric & Gas Co., Newark, representing participating companies in New Jersey.

Fred B. Hofft, vice-president, The United Gas Improvement Co., Philadelphia, representing participating companies in Eastern Pennsylvania and Delaware.

Mr. Wolf also announced that Will C. Grant, advertising director of the Lone Star Gas System, Dallas, has been appointed a member of the national advertising copy committee, succeeding Willard G. Wiegel, who has been appointed personnel manager of that company.

Woman Utility Head Wins Further Recognition

Mary E. Dillon

MARY E. DILLON, president and board chairman of the Brooklyn Borough Gas Company, Coney Island, N. Y., who holds the unique distinction of being the only woman in the nation to head a major utility company, was further recognized November 8 when Mayor F. H. LaGuardia of New York City appointed her to succeed William R. Crowley of Brooklyn as a member of the Board of Education to serve until 1946.

Active in the civic, business and charitable life of her borough for many years, Miss Dillon's ability and untiring effort have won her unstinted praise from many sources, including her friend, Mrs. Franklin D. Roosevelt. She is now serving as chairman of the Brooklyn Civilian Defense Office, a post to which she was appointed by Mayor LaGuardia.

She is a director and past vice-president of the Brooklyn Chamber of Commerce; a member of the Brooklyn advisory board of the City Planning Commission, and of the Mayor's Business Advisory Committee; a director of the Brooklyn chapter, American Red Cross; a member of the Brooklyn Defense Recreation Committee and the executive committee of the New York Defense Recreation Committee.

Miss Dillon became head of the Brooklyn Borough Gas Company in 1926. She went to work for the company as a clerk in 1903 and later became general manager and vice-president.

A.G.A. Past President Heads Standard Oil

Ralph W. Gallagher

R. W. GALLAGHER, vice-president and a director of Standard Oil Company of New Jersey for a number of years, has been elected chairman of that organization, following the retirement of Walter C. Teagle. A former president of the American Gas Association (1931-1932), he is regarded as one of the country's foremost authorities on natural gas and oil production.

Mr. Gallagher has been employed by Standard since November, 1896. In 1926 he was elected president of The East Ohio Gas Company, Cleveland, a subsidiary of Standard, and in November, 1933, he became a member of the Standard board to take charge of all the company's natural gas interests.

A 13,000-ton Standard Oil tanker was named in his honor at its launching in January, 1933. The late Mrs. Gallagher was sponsor of the vessel.

Reynolds to Assist Surgeon General

APPOINTMENT of Edward Reynolds, president of the Columbia Gas and Electric Corporation, New York, N. Y., as special assistant to the Surgeon General of the Army, Major General James C. Magee, was announced by the War Department, November 10. Mr. Reynolds will have the supervision and direction of the non-professional functions of the Surgeon General's office, his duties primarily relating to the procurement of medical supplies for the Army.

Mr. Reynolds is also chairman of the board of the Columbia Engineering Corporation. He was graduated from Harvard in 1915 and served as an officer in the Navy in the first World War.

Dr. Davis to Direct WPB Research Work

DR. HARVEY N. DAVIS, president of Stevens Institute of Technology, has been appointed director of the Office of Production Research and Development, just established by the War Production Board. In this capacity, Dr. Davis will serve as technical adviser to WPB Chairman Donald M. Nelson on engineering and scientific matters. It is his general responsibility to initiate such technical evaluation, research and development work as will advance the war program.

G. E. Whitwell Heads Philadelphia C. of C.

George E. Whitwell

GEORGE E. WHITWELL, vice-president in charge of sales of Philadelphia Electric Company, has been elected president of the recently merged Chamber of Commerce and Board of Trade of Philadelphia. The merger of the 109-year-old Board of Trade and the 51-year-old Chamber of Commerce was effected on Sept. 21.

Mr. Whitwell is chairman of the Managing Committee of the American Gas Association Testing Laboratories and has long been active in national utility affairs. He is a graduate of Massachusetts Institute of Technology and has been associated with the gas and electric business since 1920.

He is co-inventor, with Daniel J. Young, of the Young-Whitwell back-run process of water gas manufacture.

Win McCarter Awards for Life Saving

WILLIAM H. HICKMAN, an employee of Godfrey L. Cabot, Inc., Charleston, W. Va., was honored October 13 when he received the McCarter Medal and Certificate for having performed an outstanding act of life saving by the prone pressure method of resuscitation. At the risk of his own life, Mr. Hickman had lifted a fellow employee, Fred Hickel, from a meter pit after the latter had been overcome by gas and gasoline vapors, and had promptly revived him by artificial respiration. His courageous action brought him not only the McCarter Medal, awarded by the American Gas Association, but also the President's Medal of the National Safety Council.

Presentation of both awards took place at a meeting of 190 company employees in the American Legion Hall at Grantsville. In acknowledging the awards, Mr. Hickman modestly disclaimed personal credit, declaring that his act was automatic as a result of the first aid training given by his company for just such emergencies. Speakers at the meeting which featured a program of safety and personnel items included O. L. FitzRandolph, safety and personnel director, and Willard P. Smith, assistant superintendent.

Another gas utility employee, Charles J. Mihok, fitter, customers' service department, The Philadelphia Gas Works Company, received national recognition for the second time on November 5 when he reviewed a McCarter Bar for repeating a signal life-saving performance. Mr. Mihok revived a woman who had been overcome by gas. He had originally performed a similar feat on November 11, 1939, for which he was awarded a McCarter Medal and Certificate.

McCarter awards are made possible by the generosity of Thomas N. McCarter, chairman of the Board, Public Service Corporation of New Jersey.

Eskin to WPB

S. G. ESKIN, director of the Robertshaw Research Laboratory, has been appointed by Donald M. Nelson to serve as a "dollar-a-year" man on the War Production Board. Mr. Eskin has been assigned to the Industrial Conservation Section, Specifications Branch.

Charles K. Strobel has been appointed assistant director of the Robertshaw Research Laboratory to carry on the research program under way. Mr. Strobel became a member of the Robertshaw Thermostat Company's Research Laboratory in September 1940.

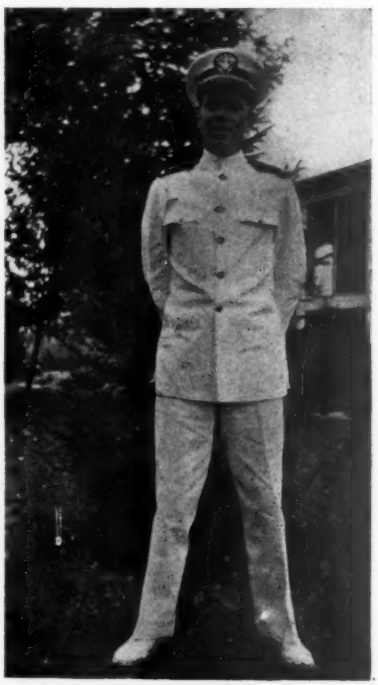
Wiegel Appointed Personnel Manager

W. G. Wiegel

APPOINTMENT of Willard G. Wiegel to be personnel manager of the Lone Star Gas System was announced recently by D. A. Hulcy, president of the company.

Mr. Wiegel has been with the company since 1928 and in 1935 was appointed advertising manager in the advertising-public relations department. He is a past president of the Dallas Advertising League, a recipient of its most valuable member award in 1937, and for the last six years has served on the national advertising committee of the American Gas Association. Advertisements of the company written by Mr. Wiegel have won high awards for a number of years in the annual better-copy contest of the Public Utilities Advertising Association.

On PT Boat Duty



Ensign Richard Melville North, son of M. F. North, general sales manager of the Northern Indiana Public Service Company, Fort Wayne, Ind., who is now on PT boat duty in foreign waters. Ensign North was district representative for the Ruud Manufacturing Co. in Indiana prior to his enlistment in the armed services

CONVENTION CALENDAR

DECEMBER

Dec. 2-4 **National Association of Manufacturers & Congress of America**
Waldorf Astoria Hotel, New York, N. Y.

8-9 **American Management Association Insurance Conference**
Drake Hotel, Chicago, Ill.

10 **American Standards Association, Annual Meeting**
Hotel Astor, New York, N. Y.

JANUARY

Jan. 13-14 **American Management Association Marketing Conference**
Drake Hotel, Chicago, Ill.

FEBRUARY

Feb. 10-12 **American Management Association Personnel Conference**
Palmer House, Chicago, Ill.

MARCH

Mar. 11-12 **A. G. A. Industrial and Commercial Gas Conference**
Hotel Statler, Detroit, Mich.

Salvage Film Offered to Gas Utilities

A 20-MINUTE sound slide film, "Let's Get in the Scrap," produced by the National Association of Manufacturers, 14 West 49th St., New York, N. Y., has been made available at $5.00 per copy to aid the government's salvage drive. Several gas utilities already using the film report that it is most effective for individual plant showings. More than 600 industrial firms are making use of the presentation which was designed by the country's leading salvage experts.

The first five minutes of the film emphasize the importance of the nationwide scrap campaign, pointing out that without an ample scrap pile our major war plants cannot maintain top production speed. The remainder of the film tells how to organize the campaign within an industrial plant. Boiled down, the essential recommendations are:

Appoint an executive who has authority to organize and carry out the decisions of the salvage committee in charge of the drive.

Prepare a complete inventory of the scrap in your plant.

Instruct foremen and plant personnel in the necessity for a successful scrap campaign in which all in the plant must cooperate.

Copies of the film may be secured by writing directly to the National Association of Manufacturers.

Priority-Free Pipe

A NEW priority-free pipe, which can replace steel pipe for a number of important uses, has been developed by the Flintkote Co. using Vinsol, a synthetic resin made from pine tree rosin by Hercules Powder Co. The new material consists of layers of paper impregnated with the resin and subjected to a pressure of 1,500 pounds.

Starts Advertising Clearing House

AS a service to the gas industry, Surface Combustion, Toledo, Ohio, has established a clearing house of gas utility advertising with the purpose of encouraging gas companies to maintain adequate public contacts during the War period. Under the direction of W. J. Grover, marketing director of the company, this campaign to make the gas industry aware of the possibilities in the most progressive advertising in its ranks, has the over-all theme, "It's Cheaper To Hold a Market Than To Rebuild One."

The first group of utility wartime advertisements together with an attractive folder in which to file them, was mailed recently to a large group of gas companies. It contains outstanding examples of current advertising with emphasis on conservation, limitation orders, war effort, and service themes. The series of advertisements reproduced in the first portfolio is accompanied by suggestions on how to retain customer good will and assist in building a post-war market. Additional mailings will be made from time to time.

In making this valuable service available to the gas industry, Surface Combustion points out that utility advertising has three important objectives in addition to the Number One job of defeating the Axis: it must maintain the benefits of previous merchandising effort and the position now held by gas; it must obtain a better appreciation of the utility as a good citizen; and it must build a preference for gas service on which the utility can capitalize in the post-war market.

Fuel Oil and Kerosene Sales Up in 1941

DELIVERIES of fuel oil and kerosene were of record volume in 1941 according to a survey conducted by the Petroleum Economics Division, Bureau of Mines, United States Department of the Interior (Mineral Market Report No. MMS 1026), results of which were released November 5. Sales of fuel oil rose to 554,329,000 barrels in 1941, an increase of 11 per cent as compared with 1940, the previous record year. Defense activities were the direct cause of greatly increased sales to railroads, gas and electric power plants, smelters, mines, manufacturing industries and the United States Services, according to the report.

New Approach in National Gas Advertising

"What on earth has a battleship got to do with my cooking?"

JACK: Plenty, Mom . . . plenty! They tell me down at the Navy yard almost everything that goes into making those babies is cooked with *Gas*.

MOTHER: *Cooked? What do you mean cooked . . .*

JACK: Heat-treated . . . to give the metal proper toughness. For instance, Gas cooks armor plate so it will shake off big shells and not shatter under gunfire. And the steel for tanks, guns, planes and bombs . . . they're all cooked with Gas!

MOTHER: *But why Gas?*

JACK: Why Gas! You ought to know . . . because it saves time and money makin' a battlewagon—just as it saves you time and money cookin' a meal!

MOTHER: *So that's why they say we may be asked to conserve Gas for home uses this winter.*

JACK: That's it, Mom . . . Gas is mighty important stuff, and they need lots of it to win the war!

MOTHER: *Well, if I can help . . . I'll be glad to do my bit.*

JACK: Now you're cookin' with Gas . . . Mom!

★ 85,000,000 Americans depend on Gas to save time, money and food in cooking . . . to preserve food safely in silent Gas refrigerators . . . to heat water and homes. That's why they've made the Gas Company community headquarters for cooking and nutrition information! If you want the latest advice on these all-important subjects . . . consult your Gas Company

AMERICAN GAS ASSOCIATION

GAS *is vital to war production . . . use it wisely!*

Buy War Bonds today—save for the Certified Performance Gas ranges of tomorrow.

A new human interest approach is introduced in this latest national gas industry advertisement scheduled for publication in December magazines

Paul R. Jones, Cities Service Secretary, Dies

PAUL ROBERTSON JONES, director and secretary of the Cities Service Company, New York, since it was organized in 1910, and an officer of many other utility corporations, died Nov. 10. He was sixty-six years old.

When the Cities Service Company was organized, Mr. Jones was named secretary, a position he held until his death. He was also chief auditor in charge of all accounting for the organization, which called for his traveling from 30,000 to 40,000 miles a year throughout the United States. Prior to joining Cities Service, Mr. Jones was secretary of The Lincoln Gas and Electric Company.

He was a member of the American Petroleum Institute, the American Gas Association, the Ohio Society, the National Geographic Society and the Academy of Political Science.

Surviving are his wife, Mrs. Alma Malone Jones; a daughter, Mrs. S. Dwight Parker, and a brother, Dr. Wiley Jones, of Denver.

CP News Letter Makes Its Bow

THE first edition of "CP News Letter and Opinion" made its bow on November 16, filled with items of interest to the gas industry. Published by the Association of Gas Appliance and Equipment Manufacturers, 60 East 42nd St., New York, N. Y., the purpose of this bulletin, according to John E. Bogan, sales promotion manager, is "a desire on the part of CP gas range manufacturers to provide a terse digest of developments, trends and ideas . . . . to help the gas industry hold the gas cooking load in tomorrow's market."

The first issue pays particular attention to the forthcoming CP campaign which will have as its theme, "Buy War Bonds Today —Save for Tomorrow's CP Gas Range." Pithy news items make up the balance of the letter. It will be published periodically and contributions will be welcomed by Mr. Bogan, the editor.

Mid-Southeastern Gas Association

R. L. McCUEN, Duke Power Co., Charlotte, N. C., was elected president of the Mid-Southeastern Gas Association at the one-day meeting held in Raleigh, N. C., November 13. Other officers named at this meeting are: E. J. Meade, Atlanta Gas Light Co., Atlanta, Ga., first vice-president; J. S. Rider, Sumter Gas and Power Co., Sumter, S. C., second vice-president; and Edward W. Ruggles, North Carolina State College, Raleigh, N. C., secretary.

Gas Directory

THE Federal Power Commission has announced the publication of a Directory of Gas Utilities giving names and addresses of gas companies in the United States with much data on operations.

The directory is sold at $2.00 a copy by the Federal Power Commission on checks payable to the Treasurer of the United States.

What Happens to Salvaged Scrap Iron

Thousands of tons of scrap iron and steel are melted in natural gas open hearth furnaces at the steel mills. This photograph shows a 20-ton gas open hearth furnace with a box full of scrap being charged through the center door. Gas controls, reversing valves and stack controls are shown at left. About 12 hours later the scrap will be high grade steel ready to make bombs to crush the Axis. (Photo courtesy John P. Brosius, Chairman, Metal Treating and Melting Committee)

Controllers' Study of Post-War Problems

A THOUGHT-PROVOKING study of war and post-war controllership problems is presented in a new booklet, "Wartime Planning To Meet Post-War Problems," just published by The Controllers Institute of America, 1 East 42nd St., New York, N. Y. Prepared by a committee headed by Oscar N. Lindahl, Carnegie-Illinois Steel Co., and former president of The Institute, the 55-page bulletin makes a valuable contribution to sound business management.

According to the authors, the report "constitutes an effort (1) to make an appraisal of what post-war conditions will be; (2) to determine what the problems of controllers in that era will be; and (3) to suggest ways and means of meeting them." Considerable space is devoted to an analysis of financial structures and accounting policies with an eye to war problems and their permanent effect.

Of special interest are chapters on "Current and Post-War Problems Arising from War Contracts," "Post-War Utilization of Surplus Plant Facilities," "Tax Administration," and "Relations with Governmental Agencies." There is also an appendix which refers specifically to public utility company problems.

Copies of this report are available from The Institute at a price of $1.00 per copy.

Asks Recognition for Mineral Industries

IN a thoughtful and provocative article in the October issue of "Mineral Industries," published by the Pennsylvania State College, Edward Steidle, dean of the School of Mineral Industries, calls for more recognition of the different branches of the mineral industries, including petroleum engineering, ceramics and fuel technology. Declaring that the "true valuation of mineral products as measured in terms of service to peace and war is incalculable," Dean Steidle maintains that the public generally, the government and educational institutions have failed to recognize fully the role of minerals in modern industry.

In addition to calling for unified plans of operation for schools of mineral industries, Dean Steidle presents a forward-looking plan of action.

Borger Advanced

H. D. BORGER, formerly assistant treasurer of The Peoples Natural Gas Company, has been elected treasurer and director. Mr. Borger succeeds the late Sidney J. Ratcliffe, who died in September of this year. He is a brother of Edward M. Borger, president of The Peoples Natural Gas Company, who left recently on a leave of absence to join the American Field Service abroad as an ambulance driver.

Accounting SECTION

L. A. MAYO, *Chairman*
O. H. RITENOUR, *Vice-Chairman*
O. W. BREWER, *Secretary*

Stub Plan Accounting Used in Connection with Material Issues

By H. R. BUFFINGTON

Northern Indiana Public Service Co., Hammond, Ind.

CONSOLIDATION of certain forms originating in the field and the incorporation of the stub plan to effect a saving in the paper work, simplify the accounting procedure and reduce the number of forms routing through the General Accounting Department, were the purposes of the company in drafting the Miscellaneous Order shown in the accompanying illustration.

This new form supersedes and makes obsolete five separate company forms formerly known as the Material Issue Ticket, Retirement Advice, Material Return Advice, Customer's Ticket, and the General Instruction Form.

The stub plan is not a new feature with the company, for early in 1937 this plan was adopted and placed in effect through the medium of the Payroll Distribution Time Ticket, and it was from this successful operation that the knowledge was gained which led to the adoption of the stub plan on other accounting forms. Since the installation of the Miscellaneous Order with its stub feature, the saving of time resulting from the fewer forms being prepared and handled by field employees has been satisfactory, while the reduction in the volume routing through the General Accounting Department has shown a decrease of approximately 28 per cent.

Purpose of Form

The purpose of the Miscellaneous Order is to report and charge:

A. Work done on blanket construction work orders, job orders (work charged to others), maintenance and operating accounts, and the issue, excess return and salvage return of material and supply.
B. The retirement of property on a retirement blanket work order and the salvage of material in connection therewith.
C. Instructions to perform work on customers' premises which does not require material. Miscellaneous orders used for this purpose are not forwarded to the General Accounting Department nor are they given a number by the local storekeeper, but are kept by the district for local use only.

Preparation of the Miscellaneous Order

Three sheets of this form constitute a set, each set being prenumbered for local district control only, as each number must be accounted for by the District Engineering Department in connection with posting the maps and records.

A stub section of four stubs is in the upper right-hand section of the form, and each stub bears an identifying number at the left end. The top stub is reserved for work order number. The first sheet of each set has the stub section perforated and is known as the original.

Material issues and returns to stock in connection with blanket construction and maintenance, operation, job orders, or a combination of any of these, are made on one miscellaneous order to the extent of four stubs. Maintenance or operating charges made in connection with a retirement, are reported on one miscellaneous order within the limit of four stubs.

All material issued or returned which is listed on the miscellaneous order is referenced by placing in the last column in the body of the order the stub number on which the charge or credit account has been entered. This column is headed "Stub Reference Number." Such reference ties the stub and body of the order together and gives the necessary identification for future reference after stubs have been detached.

The original copy of the Miscellaneous Order on which material has been issued or returned and retirements have been made, is submitted to the General Accounting Department when each job is completed or at the end of each monthly accounting period.

The Work Order stub is used only when work order material is issued, returned, retired or salvaged on the order.

One carbon copy is retained for the storeroom file, and the other is forwarded to the District Engineering Department. The form is prepared in longhand in triplicate by the district engineer or the person in charge of the work to be done. The employee preparing the order enters the charge accounts on the appropriate stubs. When the order is used in connection with a blanket work order, the work order number is inserted in the main body of the order and on all stubs used.

Information To Be Supplied

The information required in the upper left-hand portion of the order differs slightly depending upon the use of the Miscellaneous Order:

A. *For blanket work orders and maintenance accounts*—All information is shown except in the case of "town" or "rural," where only the appropriate designation, never both, is used. The address, if required by the issuing office, is supplied.
B. *For job orders and operating accounts*—Date, material ticket number, storeroom, location and description of work are shown.

The person preparing the order inserts in the spaces provided, the necessary information depending upon the type of the order:

Retirement Data—Year installed, units retired description of material, blanket work order stub number in stub reference column.

Construction Additions, Maintenance, Operation and Job Orders—Description of material, estimated quantity required, company code number when available, blanket work order stub number or appropriate operating account stub number, in stub reference column.

The person executing the Miscellaneous Order corrects the quantity retired when original estimate is incorrect, verifies the descriptive data, lists the material items to be returned to the storeroom (for example, if a guy is retired, the anchor, rod, wire, clamps, etc. are listed), and inserts the stub reference number of the blanket work order number for each material item returned to the storeroom.

For each item of material issued, the person executing the Miscellaneous Order records quantity returned to storeroom as excess material; and quantity returned to storeroom as salvage, listing separately for each account and the blanket work order number with references to the appropriate stubs. Care is exercised so that excess returns affect the account or work order to which the material was originally charged.

All material charges, returns and net issues are shown on all copies of the Miscellaneous Order.

The storekeeper does not issue material on a Miscellaneous Order unless all material items are reference numbered to a stub bearing the work order number, account or a job order number. The storekeeper inserts the material ticket number as follows; on the original copy, on the body of the form and on each stub used, and on the first and second carbon copies, only on the body of the order.

The material stock code numbers not shown by the issuing office are inserted. All material charges, returns and net issues are shown on all copies of the Order. Net issues are shown in black when issues exceed the returns. When gross issues are less than the returns, resulting in a credit net issue, the quantity is shown in red. Care is exercised with respect to correct designation of credit net issues. The unit and unit prices are inserted. The storekeeper or his assistant acknowledges all excess material returned or salvaged material received in the storeroom by dating and signing the Miscellaneous Order.

Advantages of the Miscellaneous Order

Prior to the adoption of the Miscellaneous Order, the material ticket, upon arrival in the General Accounting Department, was checked for extensions, and the credits were summarized by stock code accounts. Tickets were then sorted into expense account order, totaled and balanced with the summary of credits to stock. The journal was then prepared for posting.

The use of the Miscellaneous Order has changed this method. When the Miscellaneous Orders are received by the General Accounting Department they are extended and reviewed. When a sufficient number are available they are released to a clerk who detaches the stubs from the body of the order and sorts the stubs in work order or account order. This group of stubs is then forwarded to the various bookkeepers who by use of a two-register Sundstrand Class A accounting machine (with certain automatic features) tape the stubs charged to each account and post the totals to the summary ledger cards. The body of the Miscellaneous Orders of this same group is also released to a bookkeeper and the credits to stock are summarized in a similar manner. The credit side of each group is balanced against the charges. Several groups of stubs and orders are released throughout the month with the final group including the last Miscellaneous Order issued in the monthly accounting period. By this method it is possible for the bookkeepers to post continuously throughout the month, and the peak which formerly occurred has been eliminated.

Join Controllers Institute

WELDON M. PAGETT, assistant secretary of the Pan American Gas Company, and Lloyd V. Tracht, assistant secretary and assistant treasurer of the United Gas Corporation, both of Houston, Texas, have been elected to membership in the Controllers Institute of America, a technical and professional organization of controllers devoted to improvement of controllership procedure.

Milne Heads Auditors

ROBERT B. MILNE, auditor of Columbia Engineering Corp., New York, has been elected president of the Institute of Internal Auditors, Inc.

M.O. **A** 229

MISCELLANEOUS ORDER
NORTHERN INDIANA PUBLIC SERVICE COMPANY

DATE PREPARED ____ POLE NO. ____ BLKT. W.O. NO. ____
TOWN ____ RURAL ____ MAT. TICK. NO. ____
ADDRESS ____ STOREROOM ____
COUNTY ____ TOWNSHIP ____
LOCATION ____
PLANT - SUBSTATION - SYSTEM LINE NAME
DESCRIPTION OF WORK ____

1 AMOUNT $ ____
M. T. NO. ____ W. O. NO. ____

2 REF. W. O. NO. ____ AMOUNT $ ____
M. T. NO. ____ ACCOUNT OR J. O. NO. ____

3 REF. W. O. NO. ____ AMOUNT $ ____
M. T. NO. ____ ACCOUNT OR J. O. NO. ____

4 REF. W. O. NO. ____ AMOUNT $ ____
M. T. NO. ____ ACCOUNT OR J. O. NO. ____

RETIREMENT DATA		DESCRIPTION OF MATERIAL	ESTIMATED QUANTITY	CODE NUMBER	QUANTITY ISSUED	QUANTITY RETURNED	NET ISSUES OR RETURNS	UNIT	UNIT PRICE	NET AMOUNT	STUB REF. NO.
YEAR INSTALLED	UNITS RETIRED										
									TOTAL		

MATERIAL RECEIVED FROM STOREROOM ____ DATE ____
MATERIAL RECEIVED IN STOREROOM ____ DATE ____

PRICED	EXTENDED		POSTED
	1	2.	

PREPARED BY ____ WORK COMPLETED ____ DATE ____
STD. FORM 224-41

Residential Section Activities Outlined at Managing Committee Meeting

B. A. Seiple

A PROGRAM of activities for the Residential Section of the American Gas Association for the new year was outlined at a meeting of the Managing Committee in Chicago, October 4. E. J. Boyer, of Minneapolis, retiring chairman of the Section, opened the meeting and introduced B. A. Seiple of Asbury Park, N. J., incoming chairman, who presided.

Emphasizing the importance of maintaining public acceptance of residential gas service during the war, Mr. Seiple referred to the depression period of the early 1930's as having proved beyond question the value of the residential load and revenues in maintaining the solvency of the gas industry. He stated that the post-war cycle would inevitably bring a resurgence of residential business and that the Association and company programs should be prepared with this in mind. He commended the action of the Association in setting up a Post-War Planning Committee.

War Bond-Range Program

W. M. Chamberlain, of Grand Rapids, Mich., chairman of the Domestic Range Committee, outlined the "Deferred Delivery Freedom Purchase Plan" being prepared by John Bogan, Association of Gas Appliances and Equipment Manufacturers. This plan, which is based upon the purchase of war bonds with the purpose of converting them later into gas appliance purchases, is awaiting government approval.

Refrigeration Committee activities were discussed by C. V. Sorenson, of Hammond, Ind., chairman, and incoming vice-chairman of the Section. This committee will continue the recent series of refrigeration bulletins illustrating effective methods of keeping gas refrigeration in the public eye and will supplement this service with a series of institutional advertisements for gas company use covering conservation of gas and equipment and the value of gas refrigeration.

The work of the House Heating and Winter Air Conditioning Committee, according to W. L. Jones, of Webster Groves, Mo., chairman, will center around the proposed Certified Performance requirements for gas-fired forced-air heating installations. All phases of this plan, including promotion, will be considered.

Jeannette Campbell, of Minneapolis, chairman of the Home Service Committee, presented a comprehensive plan of work for that group, including such subjects as (1) regional organization, (2) home service in war time, (3) fuel conservation, (4) equipment conservation, (5) planning for the future, and (6) special demonstrations.

Activities to stimulate market and economic research will continue unabated, Hall M. Henry, of Cambridge, Mass., chairman of the Market and Economic Research Committee, reported. A revision of the 1936 Association report on gas house heating rates, servicing and sales promotion will be made and the committee will release shortly a case study on the economic life of gas appliances. Mr. Henry also stated that a study of the value of new business activities would be undertaken.

An outline of the past year's activities of the Housing and Realty Projects Committee, Marcy L. Sperry, Washington, D. C., chairman, read at the meeting, revealed that this committee had done important work in connection with Federal housing agencies, housing utility standards, and competitors' activities.

Mr. Seiple announced that the Residential Section's Sales and Service Relations Committee would be discontinued this year but that representatives of the Section would serve on the Technical Section's Appliance Servicing Committee.

In the absence of George W. Brown, of Newark, N. J., chairman of the Window and Store Display Committee, and C. S. Stackpole, of Baltimore, Md., chairman of the Water Heating Committee, reports of these groups were held in abeyance.

The meeting concluded with a general discussion of the value of the Sales Managers' Round Table Discussions held during the past year, and it was agreed that each region would determine its own needs. It was reported that the New York-New Jersey and Eastern Natural Gas groups were planning fall meetings of this character.

FIRE LOSS

Gas appliances and gas fuel have dropped to 25th place in incidence of fires and 26th place in dollar losses, according to the latest estimates of the National Fire Prevention Association. This is far lower than the record of any other fuel and fuel equipment.

Advertising the Gas Range of the Future

Setting the stage for tomorrow, these current gas utility advertisements anticipate the end of wartime restrictions and future gas range developments. It's a new trend in gas advertising.

How S. F. Women Give Time to Defense Jobs

5:45—Home again! Mrs. Cleo Filsinger arrives with bundles after another good day's work for defense. It is just a quarter to six by the clock.

6:00—Um! Um! The casserole with beans, apples, bacon looks good enough to eat! Put into oven (the squash is already there) at 6 o'clock.

6:10—The chard washed, cleaned, Mrs Filsinger puts it in boiling water. It will be ready at 6:25 and give her menu necessary greens.

6:20—Arrange shredded cabbage in salad bowl—it's well chilled from being in refrigerator since five minutes after six; it's now 6:20.

6:30—Now you can say "Dinner is served!" There's milk on the table to keep you well and ready for next day's work at defense headquarters.

PICTURED above is a typical illustration of how to prepare a dinner in 45 minutes flat. When women are working for defense, they must learn to add extra hours to their day and give those hours to the service of their country. The demonstration was given by Mrs. Cleo Filsinger, home service director, Pacific Gas & Electric Co., San Francisco, and was photographed by the San Francisco *Call-Bulletin*.

Sponsored by the S. F. County Nutrition Council, a series of such demonstrations by Mrs. Filsinger, a council member, showed women how to give their time to Red Cross, A.W.V.S. and other defense and relief agencies and still manage simple, nutritious, attractive meals for their families—or for themselves if they live alone.

Here is how it's done:

You work until 5 o'clock at a defense center and allow yourself 45 minutes to reach home, stopping to select whatever you may need as you pass the store.

This is your menu, which, incidentally, supports the national "Share-the-Meat" program: Casserole of baked beans with bacon and catsup, apples, Danish squash, fresh buttered chard, cole slaw with mustard dressing, whole wheat bread and butter, pears and gingersnaps, crackers and cheese, coffee for grownups, milk for all.

And here is your time schedule:

5:45—Arrive home, light oven, set at 400 degrees Fahrenheit, then remove wraps.
5:50—Wash squash and place in oven whole.
6:00—Prepare casserole and place in oven.
6:05—Wash and trim cabbage and place in refrigerator to chill. Prepare dressing.
6:10—Wash chard in several waters and put in boiling water.
6:15—Arrange dessert ready to serve and fix cheese and cracker board. Put salted water on to boil.
6:20—Shred cabbage, add dressing and arrange in bowl. Place on table.
6:25—Put on bread, pour water, split squash and remove seeds. Drain and season chard, arrange on plate with squash quartered around. Serve casserole and pour milk.
6:30—Dinner is served.

Good News for the Marines!

GOOD news for the Marines is contained in the latest news item which demonstrates anew the flexibility and adaptability of utility home service organizations to the war emergency. Under the direction of Irene Hickey, home service director, Michigan Consolidated Gas Co., Detroit, members of the Detroit Marine Corps League Auxiliary recently finished baking 60 dozen cookies to be mailed to Marine training camps. And each week, the unit expects to mail 50 pounds of homemade goodies to a platoon designated by Capt. Charles Popp, head of Marine recruiting in the city.

The auxiliary, made up of mothers, wives, daughters and sisters of Marines in active service, meets regularly at the gas company auditorium to bake the cookies. It all started when a homemaker at a home service demonstration asked if the Marine auxiliary could use the home service facilities for this purpose.

Thursday has been set aside for this activity. Each week two groups come in—one at 9:00 o'clock and another at 11:00—and make about 700 man-size cookies.

Baking cookies for the Marines

Metal Congress Features Gas in War Production

BASED on the obvious fact that "this is a war of metals" the 1942 National Metal Congress and Exposition was the focal point of thousands of the men who have the responsibility of turning the nation's supply of metals into arms, armament, and military transport on land and sea. The Metal Congress extended from October 12 to October 16 with parallel sessions every morning and afternoon. The exposition was open each day from twelve noon to ten-thirty P. M., with an attendance of over 52,000 persons. The attendance was limited to those interested in metals and metal treating, as the public was not admitted.

The Metal Congress was a Mecca for industrial gas men and manufacturers of industrial gas equipment. On Wednesday the American Gas Association Metal Treating and Melting Committee held its organization meeting for the Association year 1943. This meeting was presided over by John P. Brosius, of the Equitable Gas Co., Pittsburgh, chairman of the committee, and a complete program of committee work for the new year was arranged.

Warren D. Fuller, The Selas Company, demonstrating method of quickly removing radiant gas burner from furnace wall

Representing the A. G. A. Metal Treating and Melting Committee, Frederick O. Hess, president, The Selas Company, Philadelphia, who is a member of the committee, presented a paper at the Metal Congress entitled "Advances in Fast Surface Hardening." This paper described some of the startling recent developments in applying gas to metal heating at rates heretofore considered impossible. Mr. Hess gave an example where 40,000,000 B.t.u. per cu.ft. of combustion space is released per hour, pointing out that this is about ten times the "maximum possible" only a few years ago. Such tremendous heat releases, under perfectly controlled conditions, are opening up entirely new conceptions of industrial gas heating. Copies of Mr. Hess' paper can be secured from A. G. A. Headquarters.

The Thursday afternoon session of the National Metal Congress was presided over by E. G. de Coriolis, research director, Surface Combustion, who skillfully conducted a symposium on the large heat-treating operations which included a number of prominent metallurgists and company executives.

The National Metal Exposition held concurrently with the Metal Congress was a large, well-planned educational display designed to help those responsible for war production to produce more and better arms and ammunition. Demonstrations of new and speedier methods and equipment for nearly every type of heat treating were held. The attendance was composed mostly of production engineers, superintendents

Industrial gas equipment in full operation at National Machine Works' exhibit

Crowds watching magician at the booth of Despatch Oven Company

Demonstration of new type gas-heated tool furnaces. Delaware Tool Steel Corporation

Busy scene at Surface Combustion display. Note close attention paid to gas exhibits in this well-conceived demonstration

Demonstration of open gas flame annealing of 20mm. steel cartridge cases. Morrison Engineering Company

Crowd watching Selas demonstration of hardening 75mm. army piercing shot with 4-minute heating cycle

and executives of plants throughout the country that are turning out war materials at a rapidly increasing pace. Hundreds of Army and Navy officers were present getting firsthand information on equipment and improved heat-treating processes.

Industrial gas equipment was effectively displayed at the exposition and all exhibits and demonstrations were geared to the war production effort. The following industrial gas equipment manufacturers conducted displays:

National Machine Works
Surface Combustion
The Selas Company
American Gas Furnace Company
Despatch Oven Company
Morrison Engineering Company
Delaware Steel Tool Company
Baker Furnace Company
McCann Furnace Company

Noticeable was the trend toward open flame or furnaceless heating, as exemplified in both the industrial gas exhibits and in the exhibits of industrial electric heating. Morrison Engineering Company featured a demonstration of annealing cartridge cases with open gas flames. The Selas Company's demonstration of the new four-minute cycle of heating 55 mm. armor-piercing shot to hardening temperature with gas without the use of conventional furnaces, attracted big crowds every day. Selas also demonstrated open gas flame hardening of gears and other parts used in tanks and halftracks.

National Machine Works demonstrated the extent to which flexibility of turndown has been developed. Burners of many sizes and types were shown operating on a 25 to 1 turndown ratio with complete combustion throughout the entire range.

Industrial gas men from all parts of the U. S. and Canada were present and took advantage of the opportunity to hold business conferences with customers from their own cities and to investigate jointly the new industrial gas production equipment being demonstrated.

Industrial Gas Meeting at Metal Congress

B. H. Gardner

THE annual breakfast of the Industrial and Commercial Gas Section, during the National Metal Congress, was held at the Hotel Statler, Cleveland, Ohio. The banner attendance was composed of industrial gas engineers, equipment company engineers and executives, editors of metals magazines, prominent metallurgists and others.

Eugene D. Milener, secretary, Industrial and Commercial Gas Section, introduced Ben H. Gardner, vice-president, Columbia Engineering Corp., the newly elected chairman of the Section, who presided at the breakfast. It was his first official act since he was elected to head the Section.

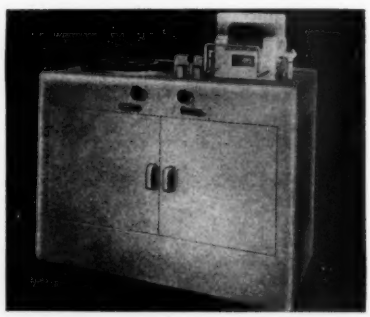
W. H. Hagen, vice-president, The East Ohio Gas Company, welcomed the group to Cleveland and explained some of the problems natural gas companies face this winter in meeting the house heating load that will be superimposed on the big war production load now being carried. He gave assurance that the industry was taking every step necessary to keep the supply up to standard, pointing out that the local company was storing gas both above and below ground.

Dr. Kent H. Van Horn, of the Aluminum Company of America, was the official representative of the American Society for Metals at the breakfast. Dr. Van Horn reviewed some of the highlights of heat-treating metals as applied in the more modern war production plants and congratulated the industrial gas men and equipment manufacturers on the effective way in which industrial gas is helping speed war production through the improved heat treatment of metals.

Closing the breakfast, W. E. Steinwedell, president, Gas Machinery Company, said he thought this annual affair was well worthwhile, that he had attended them since they were originated and that he hoped to attend many more.

Following the breakfast the Metal Treating and Melting Committee of the Industrial and Commercial Gas Section held its organization meeting for the 1943 Association year. Chairman John P. Brosius, Equitable Gas Company, presided at this meeting.

Gas Furnace Table



A good example of how industrial gas equipment is being modernized in appearance as well as mechanically is this "Furnace Table" of American Gas Furnace Company. Compact, good looking, easy to keep clean, this versatile package combines gas equipment for forging, heat treating, lead hardening, cyanide hardening, salt bath hardening and tempering. Odd jobs like soldering iron heating can also be done

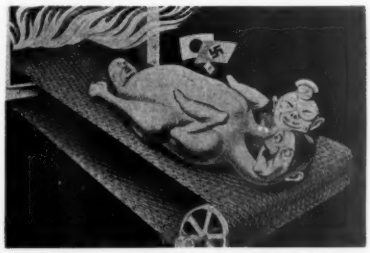
GAS AT WORK ON THE WAR PRODUCTION FRONT

The first army in history to be served toast at its bases and camps is the U. S. fighting force. Savory Equipment Company has started a trade-paper advertising campaign to further popularize the well known heavy duty revolving toaster, the radiant gas models of which have recently been streamlined and otherwise modernized.

◆

The W.A.A.C.'S use modern gas deck ovens in their training as mess officers at Ft. Des Moines.

◆



A popular use for wire-mesh-type industrial gas conveyer furnace

◆

American Stove Company is featuring an improved flue system for "island" installations of heavy duty gas ranges. Bill Frick says this has been a big help in getting gas ranges installed in army camps and navy bases.

◆

No restrictions on new ideas for the duration.

◆

Under the leadership of Dean M. L. Enger, College of Engineering, University of Illinois, a four-day short course in heat treating for porcelain enamelers has just been completed at the university. The course was sponsored by the Porcelain Enamel Institute. Enamelists are looking toward the post-war period.

◆

Wartime Conference was recently held by the National Restaurant Association. Featured was Carl Sorby who spoke on gas equipment at the Duncan Hines Family Dinner. Tom Gallagher discussed gas and gas appliances at the session devoted to "How the Dealer is Prepared to Serve You."

◆

From a small start a few years ago, machines for producing over 30,000 cu. ft. of special industrial furnace atmosphere gas each are now standard equipment for use in plants making heavy war products.

C. M. Kemp Mfg. Co. Gets Army-Navy "E"

W. Wallace Kemp, president, receives the "E" flag from Major Thomas G. Lanphier, Army Air Corps

PRESENTATION of the Army-Navy "E" to The C. M. Kemp Mfg. Co., well known manufacturers of industrial gas equipment, took place at the company's plant in Baltimore on November 12. Seven hundred workers and their families, Army and Navy officers, and State and City officials attended.

The "E" flag was presented by Major Thomas G. Lanphier, Army Air Corps, to W. Wallace Kemp, president of the seventy-six year old industrial gas concern and son of the founder. Incidentally, Mr. Kemp qualifies as the oldest employee, having served the company for forty-four years.

The "E" pins were accepted by a representative group of employees, comprising J. Elmer DeHaven—forty years' service, William Hunt—thirty-six years, and Miss Edna Hanson, who made the acceptance speech, twenty-four years.

The following night a dinner-dance was given to all employees and their families, at which time Mr. Kemp individually presented the "E" pins.

Elmer B. Dunkak, vice-president and general manager, points out that the award results from the Kemp company's part in meeting the greatly expanded requirements of the process industries for gas heating and dehydration machinery.

Carbon Black Plant In Louisiana

A HALF-MILLION-DOLLAR furnace-type plant for the manufacture of carbon black from natural gas will be erected at Eola, La., according to Joseph L. McHugh, state conservation commissioner. It will play a part in this country's synthetic rubber production.

The new plant is being built by the Southern Carbon Company and will consume gas that is presently being flared or vented into the air in Avoyelles Parish, about 120 miles north-west of New Orleans.

INDUSTRIAL AND COMMERCIAL GAS ADVERTISING FOR DECEMBER

The National Advertising Committee of the Industrial and Commercial Gas Section, J. P. Leinroth, chairman, and F. B. Jones, vice-chairman, announces that full-page advertisements will appear in the trade and business magazines listed below during the month of December. These advertisements are prepared in cooperation with the Committee on National Advertising as a part of the industry's national advertising campaign.

MAGAZINE	THEME
General Manufacturing	
BUSINESS WEEK (Dec. 19—⅔ page)	Now it's *dehydrated foods* for war! . . . another "victory job" for clean, controllable *GAS*.
Metals Industry	
THE IRON AGE (Dec. 24) INDUSTRIAL HEATING METALS AND ALLOYS	Victory *could* depend on this one bolt!
Ceramic Industry	
GLASS INDUSTRY	Bobbins of glass yarn . . . another vital product *made with GAS*.
Hotel and Restaurant Field	
HOTEL MANAGEMENT	Behind the Army's "Master Menu" . . . *GAS* for cooking and baking
Hospital Field	
MODERN HOSPITAL	"Hello Mom! They're taking swell care of me!" Yes . . . and *GAS*-cooked and *GAS*-baked food is one of the reasons.

Statement of the Ownership, Management, Circulation, Etc., Required By the Acts of Congress of August 24, 1912, and March 3, 1933

Of American Gas Association Monthly published monthly, except July-Aug. which is combined, at Brattleboro, Vt., for October 1, 1942.

State of New York, County of New York, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James M. Beall, who, having been duly sworn according to law, deposes and says that he is the Editor of the American Gas Association Monthly and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Association, Inc., 420 Lexington Ave., New York, N. Y.; Editor, James M. Beall, 420 Lexington Ave., New York, N. Y.; Managing Editor, None; Business Managers, None.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

American Gas Association, Inc., 420 Lexington Ave., New York; President, George S. Hawley; Vice-President, A. F. Bridge; Treasurer, Ernest R. Acker; Managing Director, Alexander Forward (all of 420 Lexington Ave., New York, N. Y.).

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is . (This information is required from daily publications only.)

JAMES M. BEALL, Editor.

Sworn to and subscribed before me this 28th day of September, 1942.

(Seal)

LAWRENCE P. BROWN,
Notary Public Queens Co. No. 198, Reg. No. 5181
Cert. filed in N. Y. Co. No. 149, Reg. No. 3-B-109
Commission expires March 30, 1943

An Operating Study of the Value of Gasoline for Gas-Making Purposes

By W. H. GANLEY
Falley Petroleum Company
Chicago
and
R. W. STAFFORD
Connelly Iron Sponge & Governor Co.
Chicago

THE results of a preliminary investigation made upon a request of the Chicago Office of Petroleum Coordinator to determine the value of gasoline for gas-making purposes indicated that it could successfully be used. This preliminary report was based on data obtained in the laboratory and was published earlier this year.

The data presented in this report covers the results of operating tests made at the Fond du Lac plant of the Wisconsin Power and Light Company on September 2, 1942.

The water gas machine was a Semet-Solvay eight foot reverse flow type installed in 1938. The superheater contained forty-two courses of checker brick, eighty-eight bricks per course. The bricks were staggered with two inch spacing. The carburetor contained no checker brick.

The oil pump used was a Viking rotary pump directly connected to an electric motor which operates only when the oil is being introduced. The oil was metered through a National meter and introduced into the top of the carburetor through an Anthony spray. Normally the oil is preheated ahead of the meter. When introducing gasoline the oil preheater was by-passed and the pressure was reduced to forty-five pounds. The temperature of the gasoline was 75° F. This plant's oil lines have both threaded and welded joints.

Only One Leak

The oil line from the tank truck to the machine and the oil pump were frequently inspected for leaks. Only one small leak developed, this being at the top of the carburetor where the oil line was connected to the oil spray. Since the gasoline was used directly from a truck tank, no information was developed regarding possible hazards of storing gasoline in existing gas oil storage tanks.

The pyrometer was located in the top of the superheater which on this type of machine corresponds to the base of the superheater on a standard three shell set. The pyrometer is connected to a Leeds and Northrup recorder.

The machine was equipped with air and steam meters and a U.G.I. automatic control. The B.t.u. content of the gas made was determined and recorded with a late model Thomas recording calorimeter.

The machine was operated for about an hour and a half with the fuel oil normally used. A switch was then made to gasoline without any changes in operation other than bypassing the oil preheater.

The generator fuel was 100% coal, twelve-hundred pounds being charged every twelve runs. The coal used was a 5 x 2 Fleming Elkhorn containing about 3½% ash.

The period of the test was 10.6 hours during which time 1965 gallons of gasoline were used.

The fuel bed in the generator was cleaned or clinkered the morning of the day before the test run. The normal practice at Fond du Lac is to clean the fuel bed after forty hours' operation. Since the machine is operated between ten and twelve hours per day, the fuel bed is cleaned about twice a week.

The temperature at the top of the superheater was 1450° F. at the start of the test. Fourteen gallons of gasoline were used per run but this quantity was reduced to eleven gallons after two hours because of an increase in the B.t.u. content of the gas. At the same time the temperature was dropped to 1400° F. Operations were continued at this temperature for two hours and then temperatures were raised 50° at a time over a 2½ hour period until 1650° F. was reached. After a small amount of lamp black appeared in the washbox overflow and qualitative tests showed naphthalene present, the temperatures were reduced to 1450° F. and held there during the last two hours of the test period.

The operating cycle used was as follows:

	Sec.	
Blast	45	Total generator air—3400 cu.ft.
Blowrun	7	Total generator air— 450 cu.ft.
Uprun	99	30 lbs. Steam per minute
Backrun	52	75 lbs. Steam per minute
Final Uprun	7	30 lbs. Steam per minute
Air Purge	7	
Total Cycle	217	

The following are results obtained with gasoline as compared with results obtained with other enriching agents normally used at the Fond du Lac plant:

	Gasoline	*Crude Oil*	*Fuel Oil*
B.t.u. of Finished Gas	519	522	522
Fuel-Lbs. per M.C.F.	22.2	22.1	22.5
Oil-Gallons per M.C.F.	2.60	3.04	2.93
Make per Hour—M.C.F.	71.2	78.8	79.5
Make per Run—Cu ft.	4900	5434	5480
Steam—Lbs. per M.C.F.	24.2	21.8	21.6
Generator Air—Cu.ft. per M.C.F.	785	710	703
Cu.ft. Air per lbs. steam	32.4	32.5	32.5
Percent Backrun Steam	55	55	55
B.t.u. contributed to gas per gal.	116,000	100,000	103,000
Cu.ft. Oil Gas per Gal.	75.0	67.5	70.5
B.t.u. per Cu.ft. Oil Gas	1550	1480	1460
H_2S Grains per 100 Cu.ft.	70	140*	100

*This oil contained 2½% sulphur.
M.C.F. = 1000 cubic feet.

These figures do not reflect the most efficient operation with gasoline because of changes in operation during the day, made in order to determine the effect of various cracking temperatures. The results shown on the other two enriching agents represent operating figures recorded over thirty day periods.

Cracking Temperatures

Trowel tests and observations of the washbox overflow indicated that the best cracking temperature for gasoline is about 1450° F. in this particular machine. At 1550 and 1600 degrees F. a small amount of lampblack appeared in the washbox overflow. At 1400 to 1450 degrees F. the naphthalene test showed none present. At 1500 to 1550 degrees F. the test showed considerable naphthalene.

During this test the time of contact on this machine was fifteen seconds, while with a standard three shell machine it will average about five seconds. Due to this difference in time of contact, a higher temperature will probably be required with a standard machine which has checker brick in both the carburetor and superheater.

The make per hour was lower with gasoline than with the crude oil and fuel oil. For the first four hours of the test, the average make per hour was 78.5 MCF. During this period the temperature was around 1450° F. The higher temperatures (1500-1650°) required longer blast periods which increased the length of the cycle and reduced the number of cycles per hour. During the first four hours of the test period, the runs per hour averaged 17.5 and the make per run 4474 cubic feet. For the balance of the test period, the runs per hour averaged 12.4 and the make per run 5320 cubic feet, or 66.2 MCF per hour. If the temperature carried during the first four hours had been maintained throughout the

entire test period, the average make per hour would undoubtedly have been between 75 and 80 MCF.

While it was not possible to determine the amount of tar produced with gasoline, observations of the washbox overflow indicated that the tar production is considerably less than with the crude oil.

The results of tests and analysis of gas samples below show actual analysis of samples taken during test operation. During these tests samples of all the back-run blue gases, up-run blue gases, and blast gases were collected in gas bags. They also show analysis of sample taken from outlet of storage holder before the use of gasoline was started. This represents the gas made under normal operations using crude oil.

In Test Number 1, these gases represent composite samples taken between the 33rd and 45th runs on gasoline and between the 5th and 6th coaling of the day's run. There were twelve runs during this period. In Test Number II, these gases represent composite samples taken between the 93rd and 105th runs on gasoline and between the 10th and 11th coaling of the day's run. There were twelve runs during this period.

These sets of samples were taken from the machine as follows:

Blast gases taken from top of generator during the blast period.
Uprun blue gas taken from top of generator during the uprun period.
Backrun blue gas taken from backrun pipe during the backrun period.

Two samples were taken at the outlet of the purifiers. One sample was taken about three hours after the test started; the other was taken four hours later. These samples represented the finished gas made with gasoline.

All gas analyses were made by the Bureau of Mines Gas Analyzer over mercury and are reported in per cent by volume.

The hydrogen sulphide tests were made by means of the Tutweiler Burette.

The specific gravity tests were made by the Schilling Gas Density apparatus.

The naphthalene tests were made by passing the gas through picric acid solution and observing the presence or absence of a precipitate. This test was only qualitative.

The heating values of the gas produced were taken from a Thomas Calorimeter chart.

For purposes of comparison the composition of the combined uprun and backrun blue gas was calculated as follows:

Since 55% of the total steam used per run was used on the backrun, it was assumed that 55% of the total blue gas made per run was made on the backrun and 45% on the uprun. The composition of the combined uprun and backrun blue gas was calculated by taking 45% of the constitutents of the uprun blue gas and adding it to 55% of the constituents of the backrun blue gas. This was done with the blue gas analyses of Tests I and II and the results of the two tests were averaged. An average was also made of the blast gas analyses of both tests. The calculated average composition of the total blue gas made, blast gases and finished gas is as follows:

Sample	*Blast Gas*	*Blue Gas*	*Finished Gas*
Carbon Dioxide	13.7	4.5	5.3
Illuminants	0.1	0.4	9.3
Oxygen	0.8	0.8	0.4
Carbon Monoxide	8.8	30.4	22.3
Hydrogen	3.4	52.0	31.1
Methane	0.4	3.5	10.4
Ethane	—	—	2.0
Nitrogen	72.8	8.4	19.2
Total	100.0	100.0	100.0
B.t.u. Calculated	43	305	519

The cubic foot of blast gas made per cubic foot of generator air was calculated by dividing the nitrogen in the blast gases into the nitrogen in air (79%). This gave 1.085. The average amount of generator air used per blowrun was 450 cubic feet, which produced 488 cubic feet of blowrun gas per run. This was 10% of the total average gas made per run.

The percentage of blue gas in the finished gas was calculated from the percentage of carbon monoxide in the blue gas and the finished gas. The carbon monoxide content of the finished gas was corrected for the carbon monoxide in the blowrun gas. This correction was made by deducting 10% of the carbon monoxide in the blowrun gas (blast gas) from the percentage of carbon monoxide in the finished gas. This gave the per cent of carbon monoxide in the finished gas due to the blue gas. The percentage of blue gas in the finished gas was calculated by dividing the percent of carbon monoxide in the blue gas into the per cent of carbon monoxide in the finished gas. The per cent of oil gas in the finished gas was taken as the difference between 100 and the combined blue gas and blowrun gas. (Blue gas includes whatever coal gas was recovered from the coal used for generator fuel.)

Assuming the same composition for the blue gas and blowrun gas with normal operation using crude oil and fuel oil, the finished gas was calculated to contain the following:

	Gasoline	*Crude Oil*	*Fuel Oil*
% Blowrun Gas	10.0	9.0	8.9
% Blue Gas	70.5	70.5	70.5
% Oil Gas	19.5	20.5	20.6
B.t.u. due to Oil Gas	301.5	303.0	303.0

From these results and the oil used per M Cu.ft., the B.t.u. per gallon, cubic feet of oil gas made per gallon, and the B.t.u. per cubic foot of oil gas were calculated.

RESULTS OF TESTS AND ANALYSES OF GAS SAMPLES

Enriching Medium	*Crude Oil Test Number I—Gasoline Used as Enriching Medium*					*Test Number II—Gasoline Used as Enriching Medium*				*Average of Finished Gas Samples, Test No. I and No. II*
Method of Sampling	*Snap Sample*	*Composite Sample of Gases Taken Between 33rd and 45th Runs on Gasoline and Between 5th and 6th Coaling of Day's Run. Total of 12 Runs.*			*Snap Sample*	*Composite Sample of Gases Taken Between 93rd and 105th Runs on Gasoline and Between 10th and 11th Coaling of Day's Run. Total of 12 Runs.*			*Snap Sample*	
Sampling Point	*Sendout Line*	*Top of Generator*		*Backrun Pipe*	*Outlet of Purifiers*	*Top of Generator*		*Backrun Pipe*	*Outlet of Purifiers*	
Kind of Gas	*Regular City Gas*	*Uprun Blue Gas*	*Blast Gas*	*Backrun Blue Gas*	*Finished Gas*	*Uprun Blue Gas*	*Blast Gas*	*Backrun Blue Gas*	*Finished Gas*	
Carbon Dioxide	5.6	3.4	14.0	4.8	5.4	4.2	13.4	5.6	5.2	5.3
Illuminants	8.8	0.8	0.0	0.4	10.0	0.4	0.1	0.2	8.6	9.3
Oxygen	0.6	1.0	1.2	0.8	0.2	0.4	0.4	1.0	0.6	0.4
Carbon Monoxide	22.2	34.6	8.2	26.0	22.0	38.0	9.4	25.0	22.6	22.3
Hydrogen	30.4	45.8	3.2	58.4	30.2	41.7	3.6	59.6	32.0	31.1
Methane	13.2	2.6	0.3	4.1	10.6	3.3	0.5	3.6	10.1	10.4
Ethane	1.2	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.9	2.0
Nitrogen	18.0	11.8	73.1	5.5	19.6	12.0	72.6	5.0	19.0	19.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
B.t.u. per Cubic Foot of Gas Thomas Calorimeter	518				526				515	519*
B.t.u. Calculated		297.	39.	317.		294	46.	309		
Specific Gravity (Air = 1)	0.690				0.702				0.670	0.685
Hydrogen Sulphide Grains per 100 Cu.ft. of Gas—at Inlet to Purifiers	140				60				80	70
Naphthalene—at Outlet of Purifiers					No Precipitate				Precipitate Formed	—

Note—Analyses Reported in Per Cent by Volume.
*Average of 26 readings from Thomas Calorimeter Chart over entire period of test.

Based on gasoline contining 123,000 B.t.u. per gallon, a cracking efficiency of 94% was obtained by calculation. This compares with a cracking efficiency of 70% with the oils normally used.

Due to the use of coal and blowrun, the Pacific Coast Method of calculating oil efficiencies could not be used. Since carbon monoxide is a product of the blue gas reaction and is not formed by any cracking as hydrogen is, the method used for calculating oil efficiency was considered the best.

Briefly, the above data indicates the following:

1. Raw gasoline can be successfully gasified in a carburetted water gas machine.
2. These tests indicated a cracking temperature of about 1450° F. as the best for Fond du Lac. It is believed that with a standard three shell machine a higher temperature will be required. For any given machine, the proper temperature should be determined experimentally.
3. The set capacity is approximately the same with gasoline as with the oils normally used in the manufacture of carburetted water gas.
4. Higher fuel cracking efficiencies can be obtained by the use of gasoline.
5. The tar produced from gasoline is materially less than from the oils normally used.
6. The main problem in the use of gasoline is handling and storage, including state and local regulations.
7. With the present price and tax structure, it is not economical to use gasoline. Action should be started to have the 1½¢ Federal tax law changed so that it will not apply on gasoline used for gas making purposes, since it would be used to release fuel oils and gas oils which are badly needed by war industries which are unable to convert to gasoline.

Based on current costs of gasoline, the Fond du Lac test, including Federal tax, ran slightly over 8¢ per M Cu.ft., in excess of costs using Fuel oil at present market price. This is exclusive of tar credits which would increase the differential still further.

Nitric Oxide Report Made Available

A REPORT on Nitric Oxide Control, covering the results of several years' study at the Rochester Gas & Electric Corporation by Louis Shnidman, laboratory director, has been published in pamphlet form by the Technical Section of the American Gas Association. Also included in the pamphlet is a paper on "The Quantitative Determination of Nitric Oxide in Manufactured Gases," by Mr. Shnidman and Jesse S. Yeaw. Mr. Shnidman's original report was abstracted at the A. G. A. Annual Meeting in Chicago and will be published in the January issue of the A. G. A. MONTHLY.

Copies of the pamphlet are available at A. G. A. Headquarters, 420 Lexington Ave., New York, N. Y., at nominal cost.

HOME SERVICE EXTRAS

(Continued from page 445)

mailed to customers who are not in a position to call for it. Other distribution channels are through libraries, super-markets, chain stores, and women's clubs.

Whereas in the beginning a few recipes constituted the entire issue, today, a carefully planned pattern is followed.

The material for four of the six pages is scheduled for a period of ninety days. The subjects chosen depend upon the season of the year, for example, one of the February-1943 issues will be devoted to lenten recipes. The other two pages are prepared as late as a week before the issue is due to be released. This allows for any unusual condition that may arise, and contributes to its timeliness. When meat rationing became a certainty, the two unplanned pages of October and November 1942 issues were devoted to meat substitute foods.

In addition to the main planning, a standard feature of each issue is a column on nutritional notes. These notes are short and pointed, and supply nutritional education in small doses.

Another very important feature of the Home Economics News is the back page which is devoted from time to time to marketing tips, information on the care and use of appliances, and suggestions for fuel conservation.

Newspaper Advertising

Not the least part of the endeavor of the Public Service Electric and Gas Company nutrition program is the newspaper advertising attempting to show the consumer the value of proper foods in the home—for the children and for the war worker. Since prior to Pearl Harbor this company has devoted considerable newspaper space to educate the homemaker on the proper value of foods.

All of the foregoing constitutes Public Service's war-time contribution through home service. Such activities are pluses since regular activities are still performed.

Home Service Consultants of Public Service are cooperating with Red Cross, American Women's Voluntary Services, Office of Civilian Defense, Women's Clubs and other allied agencies in conducting nutrition, canteen, and other classes throughout our territory.

MANPOWER SURVEY

(Continued from page 430)

developed jointly by the War Manpower Commission and the Selective Service System, designed to discourage draft boards from taking key workers from production lines in wholesale batches, and to permit the orderly induction of such workers into the army. Under the plan a war employer would prepare a Manning Table showing how many men of various skills he has, how long it will take to train replacements, and what his needs are for future expansion. The Manning Table then goes to the state director of Selective Service who looks it over and then, perhaps, gives it his approval.

This approval gives the employer the right to use Form 42-A bearing a "State Acceptance Stamp." One of these forms is to be filled out for each childless male employee of military age and sent to his local draft board, including the "approved" statement of how long it will take to replace him, and therefore how long he should be deferred. As always, however, the local draft board may make its own decision. If the employer is not satisfied with the rulings of local boards, he may appeal.

Forms and instructions for filling out the Manning Tables are now available at the regional offices of the War Manpower Commission. Only activities essential to the war effort may qualify for participation. These include manufacturing plants, whose business volume is 75 per cent or more in war materials, public utilities, railroads, and others.

The cross-sectional analysis of the Committee on Personal Practices clearly indicates that, while only some gas companies are already faced with a serious labor shortage, all appreciate the possibilities of one and are preparing themselves to meet the problems as they develop. It is hoped that this review contains ideas which will be at least of suggestive value to our gas company members and will help them "keep gas on the town" as their share toward winning the war.

Laboratories

GEORGE E. WHITWELL, *Chairman*
R. M. CONNER, *Director*
F. A. ALLEN, *Supervisor, Pacific Coast Branch*

Automatic Ignition of Gas Appliances

By R. M. CONNER

Director, A. G. A. Testing Laboratories

IN an article entitled "Automatic Ignition" published several months ago the writer called attention to the growing use of automatic means for accomplishing ignition of gas appliances and discussed various types of devices employed for the purpose. In view of the increasing importance of such applications and their part in the utilization of gas fuel, the necessity of their further study through an organized research program was stressed. Mention was also made of the attention which has been devoted to insuring proper operation of existing equipment through the development and application of suitable tests.

Since the former article was prepared, considerable additional work on automatic ignition has been conducted as part of the comprehensive research program sponsored by the Committee on Domestic Gas Research of the American Gas Association under the chairmanship of R. L. Fletcher. Concurrently with it, additional studies requested for the purpose of expanding various American Standard approval requirements to keep them abreast with latest developments in automatic lighting applications have also been completed. The purpose of this article is to present the most important results of these studies to supplement the facts brought out in the previous article on this subject.

Contemporary Types Tested

Attention was concentrated on contemporary types of automatic electric devices for gas ignition. Eight different styles were investigated, these including, as far as could be learned, all devices of this general nature now on the market as well as some which are still under field test. Seven are illustrated in Figure 1. Enlargements of two of these as well as of the remaining system appear in Figure 2 together with some of the test equipment used in the present studies. Of these eight electric ignition systems, seven were designed to effect ignition of the pilot gas only, while the eighth provided direct ignition of the main burners. Three were of the spark type employing step-up transformers to produce the high voltages required for ignition purposes. The other five systems were of the hot coil type. Four of these made use of step-down transformers reducing the voltage to 25 volts or less. One employed a constant current transformer which maintained 1.75 volts across the ignition coil. In all instances automatic pilots were incorporated as part of the complete assembly, thus providing means for gas shut-off in the event of flame outage or ignition failure.

The complexity presented by an automatic ignition assembly may best be realized when the number of different functions which it is called upon to accomplish are kept in mind. The primary purpose is, of course, to effect prompt and effective ignition. In addition, means must be provided for actuating a valve controlling gas flow. Depending on the method of mounting employed in an individual application, a wide range of temperatures are imposed on various parts of the complete assembly. Equally important is the fact that an automatic ignition system is required to operate frequently over a long period of time; hence the importance of substantial and rugged construction to render it capable of long life without impairment of its proper functions. Furthermore, variations in supply conditions, such as gas pressure and electric voltage, may occur which, unless properly provided for, will adversely affect the ability of the device to function normally.

In consideration of these different factors and the necessity of securing full information on their effects on electric ignition systems, the following features were selected for special study.

1. Effect of primary voltage variations
2. Effect of temperature of pilot body on ignition
3. Resistance to corrosion and wear
4. Time cycle of operation

These items will be considered in their order.

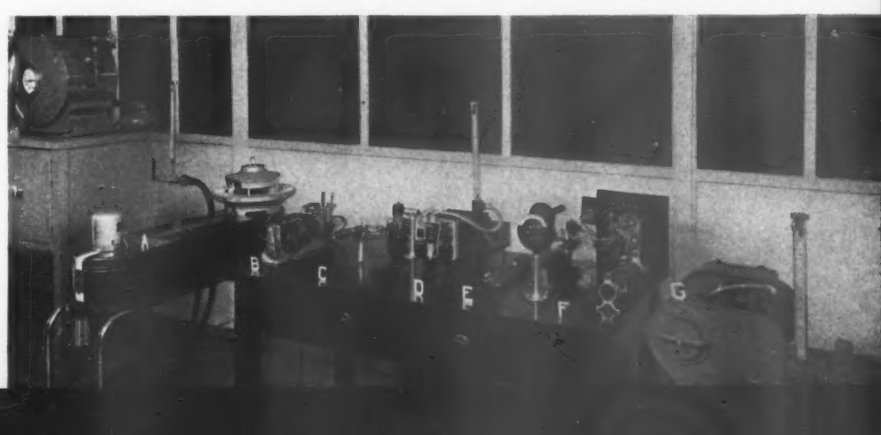
Effect of Primary Voltage Variations

As the operation of an automatic electric igniter usually consists of lighting a pilot flame which then actuates a thermal element controlling the gas supply to the main burners, it is evident that variations in line voltage would affect appreciably only that part of the complete ignition operation which covers lighting the pilot gas. With one exception, all the systems investigated were equipped with gas pilots and main burner gas was controlled by gas-heated means. In the single remaining instance, main burner gas was controlled by an electrically heated thermostatic element.

Each individual assembly was subjected to a number of different primary voltages and effects on ignition characteristics noted. In all but one instance step-up or step-down transformers were employed, a given change in primary voltage producing a proportionate change in secondary voltage. Minimum voltages at which the various devices would operate were first determined. Two of the spark type devices effected ignition in less than 0.5 second with only 50 volts across the transformer primary. All devices operated at a minimum of 104 volts or less although the time required for ignition varied over a considerable range. With normal voltage of 110, all except two ignited the gas pilot within 30 seconds. This is the maximum time permitted by approval requirements for domestic gas ranges for gas pilot ignition. These two units, however, were designed for industrial heating and central heating applications. A principal portion of the time consumed for ignition was required for turning on gas to the pilot burner. Under these conditions their performance was regarded as satisfactory.

Increase in voltages above the minimum required for operation usually produced a material decrease in time of ignition. Over a range of 88 to 138 volts, which represented a decrease of 20% below, and an increase of 25% above normal, satisfactory performance took place with 6 out of the 8 devices. In both cases where failures occurred they took place at the lower voltages. Therefore, it will be seen that in a large percentage of cases contemporary igniters will operate satisfactorily over a wide variation in voltage.

Fig. 1. Seven of the eight automatic electric ignition devices studied



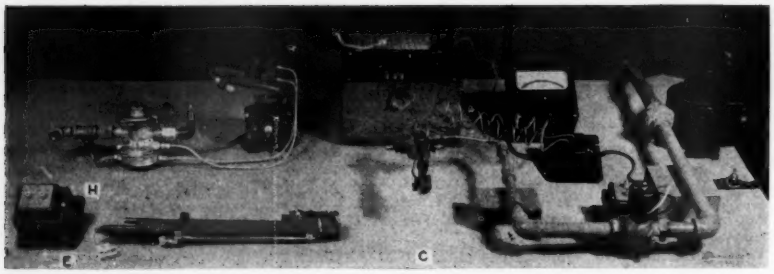


Fig. 2 Electric ignition devices C, E, and H, and apparatus employed in studying effects of temperature and voltage variations. (An indicating potentiometer is shown behind unit C, a voltmeter at its right, and a variable voltage transformer at extreme right)

Observations were also made on the 3 spark type igniters to determine the effect of spark gaps of varying lengths. Figure 3 shows the minimum voltages required to produce sparking across the various lengths and types of spark gaps investigated. As might be expected, best ignition characteristics were secured with 2 needle points. Only 92 volts were required to produce a spark across a gap of 0.047 in. In contrast blunt point-to-blunt point gaps required 130 volts. Obviously, however, a needle point spark gap would not be capable of a satisfactory life and would, therefore, be impractical for field service. For this reason it is necessary to resort to an intermediate type of gap such as the blunt point-to-plane or blunt point-to-blunt point type for practical reasons. Figure 4 presents a close up view of the spark portions of the 3 spark igniters. Two employed what may be classified as blunt point-to-plane gaps. The third is of the blunt point-to-blunt point type as the spark jumps from a wire electrode tip to gas port edge.

Effect of Temperature of Pilot Body on Ignition

Automatic igniters in service may be called upon to act over a considerable range in temperatures. Originally placed in operation at room temperature, from this point they will be subjected to a more or less unknown temperature increase depending on the individual characteristics of the igniter as well as its mounting in the appliance. For the purpose of the present determinations, elevated temperatures used were taken as those obtained as the result of heat from the pilot alone without considering the main burners. More readily comparable results were thus possible without introducing added temperature variables which might result from individual burner combinations.

All igniters were found to reach equilibrium temperature within 30 minutes, the majority requiring only 15 minutes. Temperatures in practically all instances were 300° F. or more. With the pilot bodies at their equilibrium temperatures, observations were made to determine the time required for ignition to take place as compared with that at room temperature.

Figure 5 shows graphically variations in ignition time. An outstanding feature is that the time of ignition of 2 of the spark devices was not affected appreciably by pilot burner temperatures as ignition took place in less than 0.5 second under both conditions observed. The remaining spark device represented by the curve marked A as well as three of the coil types shown by curves C, E, and G functioned readily at low voltages and more rapidly when hot than cold. However, another coil igniter represented by curve B operated more rapidly when cold on line voltages above 110. This appeared to be due to the presence of air currents which slowed down ignition at elevated temperatures. Provision of a protective housing would probably have modified this condition.

In general it may be stated that electrical ignition devices will function more readily and at lower voltages under hot than cold conditions. As typified by the instance mentioned above, however, much may depend on the manner in which the installation is made. It is, therefore, necessary to insure that satisfactory performance will be obtained under both hot and cold conditions so as to provide for all possible contingencies.

Resistance to Corrosion and Wear

From present experiences as well as from long and successful use of spark plugs in automobile engines it was felt that igniters of this type should prove durable, satisfactory and capable of continued operation over long periods of time. Compared with these applications the coil types introduced a number of variables and some doubt was entertained as to whether they would prove capable of withstanding repeated operations under service conditions. Ability of small coils of fine wire, such as were employed in several of the samples tested, to resist sagging, warping or burning out was therefore investigated.

Each of the 8 devices was subjected to

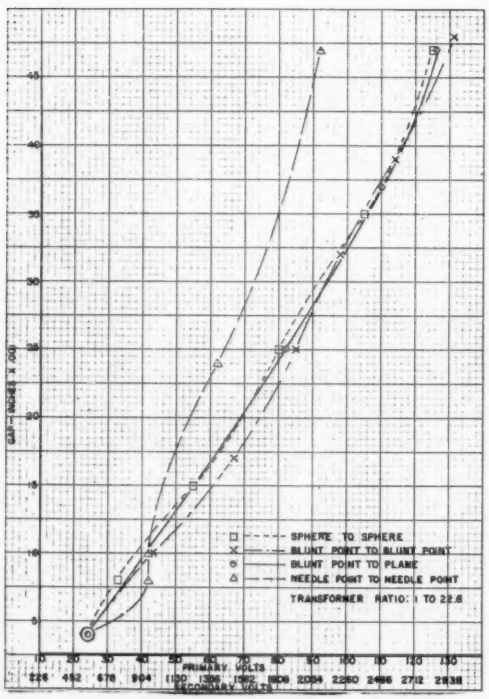


Fig. 3 Minimum voltages required to initiate sparking across various lengths and types of spark gaps.

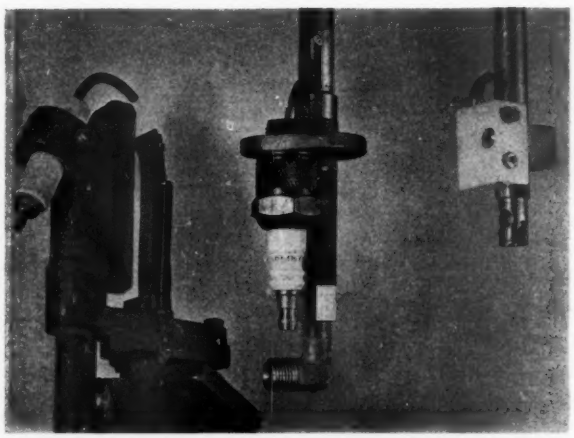


Fig. 4 Electric spark ignition devices studied

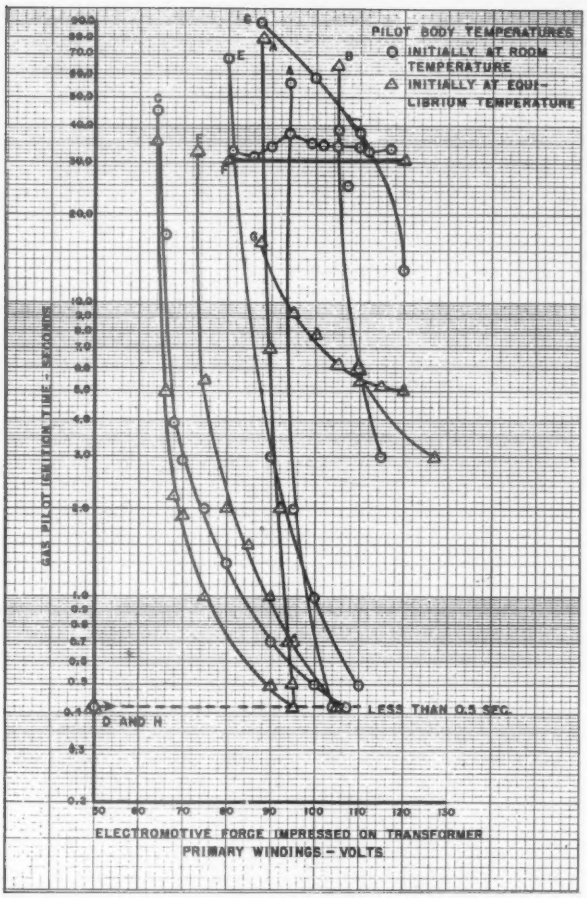


Fig. 5 Effect of electromotive force impressed on transformer primary windings on gas pilot ignition times with pilot bodies initially at room temperature and also at equilibrium temperatures

25,000 complete operating cycles and then examined to note its physical characteristics and its ability to function properly. As was expected, all of the spark types were unaffected by this life test both as to appearance and ability to function satisfactorily. On the other hand, only 1 of the 5 coil type igniters showed no visual signs of deterioration after 25,000 cycles. This is shown at the left of Figure 6. For purposes of comparison photographs of new and cycled coils of 3 other units are shown in Figures 7 and 8.

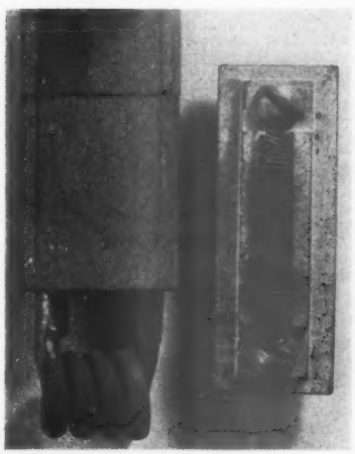


Fig. 6 Two coils after completion of 25,000 cycles of operation

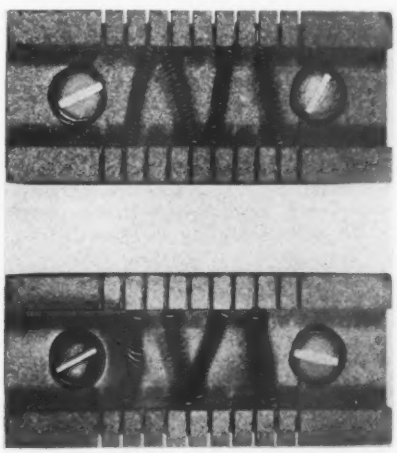


Fig. 7 Effect of continued operation on third ignition coil (unused coil above, cycle coil below)

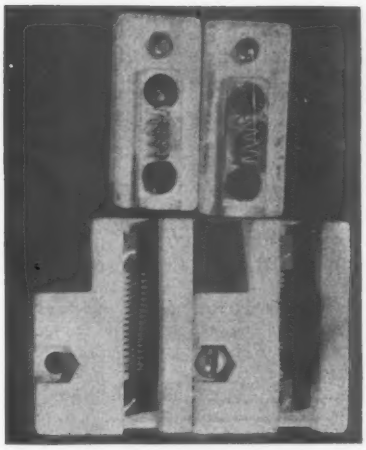


Fig. 8 Effect of continued operation on fourth and fifth ignition coils (unused coils left, cycled coils at right)

It is readily discernible from the illustrations that the cycled coils had lost their original brightness and with only one exception were dull black in color, probably due to the presence of an oxide coating. Those mounted on ceramic blocks, shown in Figures 7 and 8, were also pitted and the blocks discolored. Sagging and warping is also observed in all but the single heavy coil shown at the left of Figure 6. Comparison of the condition of these coils will readily indicate the advantages of heavier construction and its ability to withstand repeated operations.

It may be concluded from the relative performance noted that much might be accomplished in increasing anticipated service life by careful attention to design details and the use of coils selected not only to withstand extreme conditions but also so mounted as to obtain optimum results. The performance of the coil shown in Figure 7 seems worthy of special mention in this respect. This was so mounted in the pilot assembly that the 2 coils shown to the right were not effective so far as ignition was concerned. The coil at the extreme right is seen to be comparatively unaffected. Possibilities presented by changes in assembly are readily evident.

Times required for ignition at normal voltage as well as voltages at which burn out occurred were determined on the various coil devices both with new and cycled coils. With the exception of the coil illustrated in Figure 7, ignition time showed little variation. Rearrangement of the pilot flame with respect to this coil produced considerable improvement, thus indicating possibilities to be obtained by modifications in assembly.

Little difference was found in the voltages at which burning out of the coils occurred before and after cycling, except in the case of the unit shown at the top of Figure 8. An

average of 160 volts was required for burning out two new coils as compared with 128 for a cycled coil. Examination of the coil which had been cycled disclosed considerable pitting of its surface although the wire remained ductile under its external coating. It appeared that reduction in wire diameter as the result of pitting led to localized overheating resulting in burning out at such points.

Time Cycle of Operation

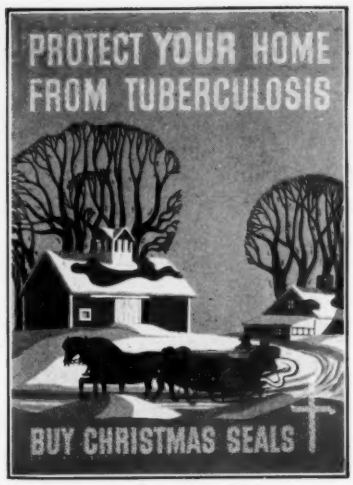
In the previous article on "Automatic Ignition" a discussion was presented of the various safety features which such systems embody to effect gas shut off in the event of burner outage, failure of the ignition system or similar contingencies. This also explained the necessity of provision for suitable purging of the system of residual gas in case of a device embodying a so-called "purge cycle." This was defined as the interval between closure of the main gas supply by the automatic pilot and re-energizing of the electrical circuit. In order to present clearly the limiting time intervals permitted for certain operations to take place, extracts are presented below of pertinent performance provisions now included in approval requirements for gas ranges.

"Where automatic electric pilot igniters are supplied, re-ignition or automatic shut-off of the main gas supply shall be effectively accomplished under the following conditions of test:

1. When the design of the system does not provide for a purge cycle, gas at the main burner shall be either automatically re-ignited or shut off within 10 seconds after complete extinguishment. If the thermostatic device closes the main gas supply within 10 seconds after extinction and before re-ignition occurs, time required for subsequent functioning of the thermostatic device to re-admit gas to the burner and for its ignition shall not exceed 50 seconds.

2. When the design of the system provides for a purge cycle, the thermostatic device shall shut off the gas supply within 60 seconds after complete extinguishment. After the gas supply has been shut off a purge cycle at least equal to the length of the closing cycle of the thermostatic device shall be automatically provided. At no time during this cycle or the purge cycle shall the system re-energize the electrical circuit of the pilot igniter. The total time for the closing cycle of the thermostatic device, the purge cycle, and for subsequent functioning of the thermostatic device to re-admit gas to the burner and for ignition of the gas shall not exceed 3½ minutes."

The different devices under investigation were placed in operation at room temperature and times required for admission of gas to the pilot, opening of the main burner gas valve and ignition of the main gas supply recorded. Four of the 8 igniters admitted gas to the main burner and accomplished ignition within less than 60 seconds. Ignition times ranged from less than 0.5 second for the unit which lighted the main burner directly to 75 seconds for a spark device with expanding rod type thermal element. In all cases the main burner was ignited within 2 seconds after actuation of the valve controlling its supply.



After each system had been in operation 15 minutes, flames were extinguished and time required to shut off the main gas supply through operation of the thermostatic device were observed. These ranged from 9.5 seconds to 68 seconds. Four igniters which operated without purge cycle accomplished gas shut off within 60 seconds. The maximum time required by 3 having a purge cycle was 68 seconds. Temporary electric failure which also produced immediate gas shut off in all but 1 instance resulted in performance generally similar to that just described.

In the case of 3 igniters which did not embody purge cycles in their assembly, considerably more than 10 seconds elapsed before either the main gas was shut off or re-ignition took place. It was thus possible for unburned gas to pass through the main burners for periods varying up to 60 seconds before closure or re-ignition. One system employed a purge cycle of only 9 seconds and required 68 seconds for shut off of the main burner. None of these characteristics was considered acceptable. It will therefore be seen that 4 of the 8 igniters examined failed to meet limiting times now specified for various operations. Desirability of incorporation of suitable changes to obtain faster performance is thus indicated.

The studies so far made may be considered as representing the introductory phase of a detailed investigation of automatic ignition now in progress at the American Gas Association Testing Laboratories under the supervision of the Committee on Domestic Gas Research. Prior to its undertaking a very complete working outline was approved by this group, to serve as a guide in its conduct. It was designed to secure fundamental information which might be applied in the development of new systems and the improvement of existing ones.

Some of the possibilities for modifications of current systems are readily evident from the results which have already been discussed. Many other factors still remain to be studied in order that all necessary fundamental data may be secured. Their early availability becomes of special importance at this time when we consider the problems offered by the post war period and accompanying demands for new and improved equipment for utilizing gas fuel. Our success in meeting them will be determined largely by the extent of our research accomplishments. A carefully planned and supervised program is now under way which has already produced valuable and tangible results. Its vigorous prosecution and early completion will provide assurance of the continued superiority of domestic gas-burning equipment with attendant advantages to its millions of users.

AA-1 For Maintenance

THE Requirements Committee of the War Production Board November 11 authorized that the top priority rating of AA-1 may be applied to essential repair and maintenance.

Included in the scope of the determination, for the first quarter of 1943, are essential repairs and maintenance for productive facilities, utilities, housing and consumers' durable goods.

Communication and transportation systems, gas, oil and water lines and other services will be assured of materials to keep them performing their essential functions. Supplies and materials needed for essential maintenance and repair for housing also may be obtained.

The existing priorities system will be used to obtain the steel, copper and aluminum needed for such maintenance and repair.

Personnel Service

SERVICES OFFERED

Engineer—26 years with engineering organization managing and operating utilities. Thoroughly familiar both natural and artificial gas. Broad training in rates, valuation, reports, surveys, property records, etc. B.S. degree in engineering. Available immediately for permanent connection, any location. **1450.**

Available for consultation—**Gas Engineer** of 40 years' experience small and medium plants. Designs for adapting to heavy oil and bituminous coal; steam accumulators; tar eliminators; compounding existing station governors; butane-air change-overs; cinder catchers; by-building equipment from scrap pile and own labor costs are greatly reduced. **1451.**

Manager, college degree, with more than twenty years' experience in management of manufactured gas properties, both coal and water gas. Familiar with operation in Spanish country. Not particular about location. **1452.**

POSITIONS OPEN

Foreman in water gas plant of 10,000 M daily capacity to supervise operation and maintenance. State age, experience salary expected and give references. **0371.**

Research Engineer for investigation of new methods of gas manufacture. Experience in gas industry desirable but research training and ability of paramount importance. Give full details with military status in letter. Enclose photograph. **0372.**

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